

KELLY-SPRINGFIELD TIRE PLANT
701 Kelly Road
Cumberland
Allegany County
Maryland

HAER No. MD-102

HAER
MD,
1-CUMB,
4-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Northeast Region
Philadelphia Support Office
U.S. Custom House
200 Chestnut Street
Philadelphia, P.A. 19106

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Location: 701 Kelly Road
Cumberland
Allegany County, Maryland

USGS Cumberland, Maryland Quadrangle
Universal Transverse Mercator Coordinates:
17.690560.4390360
17.690340.4389660
17.690040.4390000
17.690340.4390520

Date of Construction: 1918 - 1923; circa 1945

Engineer: S. Diescher & Sons, Pittsburgh, Pennsylvania
Architect: Edward Necarsulmer, New York, New York

Present Owner: Allegany County Commissioners
County Office Complex
701 Kelly Road
Cumberland, Maryland 21502

Present Use: Vacant

Significance: The Kelly-Springfield Tire Plant is a technologically and historically significant industrial complex in Allegany County. The facility was in operation from 1921 until 1987 and served as Kelly-Springfield's only manufacturing plant between 1925 and 1962. The plant was critical to the development of Cumberland during the twentieth century, and is an important record of an early tire manufacturing plant. The design, construction, and modification of the plant reflect the evolution of the tire manufacturing process.

Project Information: The former Kelly-Springfield Tire Plant will be redeveloped by the County as an industrial center. Four of the original buildings -- the factory building, power house, cement house, and cooling tower -- will be altered or demolished. Documentation of these four buildings to the standards of the Historic American Engineering Record prior to alteration or demolition was prescribed as a stipulation of a Memorandum of Agreement negotiated among the Economic Development Administration (EDA), the Allegany County Board of Commissioners, and the Maryland Historical Trust to mitigate removal of the structures. This documentation was undertaken in May and June 1995 in partial fulfillment of that agreement.

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Introduction

The Kelly-Springfield Tire Plant is a 34-building industrial complex occupying an 85-acre site in the city of Cumberland, Maryland. The site is located along the Potomac River, southwest of the city's central business district. Initial construction of the industrial complex began in 1917 and was completed by 1923. New buildings have been erected and existing buildings modified or replaced as needed. Buildings presently occupying the complex date from 1918 to 1971. The plant remained in operation until 1987.

The center of the site is occupied by the main factory building. The factory building consists of an original three-story brick core and the numerous one-story buildings that were added between 1956 and 1971. The cooling tower, machine shop, pipe shop, pump house, intake building, and power house form a support complex along the eastern side of the site, along the Potomac River. The garage and administration building (formerly the laboratory) are located along the northern edge of the site. South of the factory building is the cement house with a sawtooth roof.

The buildings of the complex are utilitarian in design and feature similar architectural characteristics. The original 1920s buildings are constructed with load-bearing masonry structural systems composed of brick and concrete. Exterior walls of the buildings are brick. Common architectural details include parapet walls with simple terra cotta coping along the roof line, regularly-spaced recessed brick bays, and expanses of windows. Buildings were all designed to maximize the use of natural light in the building interiors. The buildings' jagged roof lines were achieved through the use of a variety of clerestory windows and overhead monitors. In addition, side wall windows were used extensively. The use of center-pivot sash windows provided the buildings with ventilation as well as light.

Cumberland's Kelly-Springfield Tire Plant remained in operation for approximately 65 years. Three major periods of development are associated with this 65-year occupation. The original period of development spanned from 1921 to 1942 when the complex began its tire manufacturing operations. The second period of development lasted from 1942 to 1945 when the plant was used for ammunition manufacturing. The third period of development spanned from 1944 to 1987 when the plant again was used for tire manufacturing. The current configuration of the complex reflects these different periods of development.

The original plant, designed by the engineering firm S. Diescher & Sons of Pittsburgh, functioned as a self-contained complex. The complex had its own receiving area, machinery building, tire manufacturing facilities, shipping area, and power-generation facilities. The original complex, completed in 1923, consisted of nine primary buildings: the main factory building, power house, cement house, laboratory, pump house, intake building, pipe shop, machine shop, and garage. The complex also included several smaller support structures. Each building played a specific role in the tire manufacturing process. The factory building provided space for rubber mixing, tire manufacturing, tire curing, inspection, and storage. The power house generated the power necessary for operating the factory. Rubber cement, an ingredient used to apply the tire tread in the tire building process, was mixed in the cement house. The laboratory building contained the chemical and research laboratories. The pump house and intake building functioned together to pump water from the Potomac River to the plant. The pipe shop and machine shop provided other materials and machinery used in the tire manufacturing process. The complex also was equipped with a garage designed to house 200 cars.

The buildings in the complex were accessed by a series of railroad tracks. One spur ran along a loading dock at the east side of the main factory building to provide materials to the factory. Another rail spur extended to the west side of the building to provide a means of shipping the finished tires. A separate

rail line extending along the Potomac River served the power house, pump house, pipe shop, and machine shop.

The main buildings within the complex were linked by a system of tunnels. These tunnels carried electrical cables, piping, and inter-department traffic. When necessary, the tunnels could be used to convey machinery needing repair from the main factory building to the machine shop (Building 18) without interfering with the manufacturing process. Few significant changes to configuration of the complex were made during this earliest period of development.

The first wave of modifications to the complex occurred in 1942, during the second period of development, when the plant was converted to an ammunition manufacturing facility. Although the Kelly-Springfield factory complex continued to operate as an integrated unit, several new buildings were erected to accommodate ammunition production. These new buildings included a loading building, powder and primer magazines, salvage buildings, and guard towers. The existing buildings were converted to new uses during this ammunition manufacturing phase. The cement house (Building 23) was used for oil storage, the laboratory building (Building 20) was used as a personnel building, and the main factory building (Building 99 and Wings 1-5) were used for ammunition manufacturing. The new buildings constructed during this period no longer survive.

The second wave of modifications to the complex was initiated in 1944, at the start of the plant's third period of development, when the plant was reconverted to a tire manufacturing facility. The shift from ammunition to tires provided Kelly-Springfield with an opportunity to analyze their spatial requirements and assess their future needs. Developments in modern industrial design and its effect on industrial productivity had an impact on the redevelopment of the complex, particularly the reconfiguration of the main factory building. Although the individual buildings within the complex continued to operate during this period as they originally were designed, the main factory building was modified to increase productivity. The most significant change was the infilling of the factory building's open courts to provide a single, uninterrupted production area on the ground floor. Another structure constructed during the 1940s was the cooling tower (Building 71). This building was built to cool the hot water created during the tire making process. Hot water from the plant was delivered to the tower, cooled, and stored in an underground reservoir before being recirculated back to the plant.

The growth of the complex that was initiated during the 1940s continued into the 1950s and 1960s, reflecting the expansion of the Kelly-Springfield tire business. Numerous buildings and the many one-story steel and concrete buildings extending to the north and south of the factory core. These later additions have compromised the integrity of the original brick factory building.

The Kelly-Springfield Tire Plant was acquired by Allegany County after the factory was closed in 1987. Since that time, the buildings have remained vacant and most of the machinery within the buildings has been removed. Although the equipment no longer survives, the complex as a whole represents a tangible record of the evolution of both the Kelly-Springfield Company and the general tire manufacturing process. Current plans call for the redevelopment of the site as an industrial center.

Historic Context

Kelly-Springfield: The Beginning

During the mid-nineteenth century, everyday transportation was confined to a buggy, cart, or carriage. Most wheels on buggies or carriages were made of wood, covered by strips of metal, and known as "strip metal" tires. The "strip metal" tires were unreliable and provided an uncomfortable ride. The limitations of strip metal tires created a demand for safer and more reliable tires. During the mid-nineteenth century, cab companies began to use rubber tires. The process of turning raw rubber into a useable product had been developed by Charles Goodyear in the 1830s. Goodyear's vulcanization process, which involved heating raw rubber mixed with other chemicals at high temperatures, allowed for the commercial use of rubber.

Rubber tires were soon found to be more durable, safer, and more comfortable than metal, however, early manufacturing attempts faced numerous problems. The primary problem was developing a rubber tire that would remain secured to the wheel. Because of the rough roads found in the U. S. during the late nineteenth century, tires made of rubber were easily pulled off their wheels. To keep the tires on the wheels, rubber compounds had to be made harder and harder, thereby destroying much of the effect a resilient rubber tire was intended to have on the carriage.

Until 1894 no one had devised a reliable rubber tire for carriage wheels. In 1894, Arthur W. Grant of Springfield, Ohio perfected a method for curing cylindrical rubber strips pierced with longitudinal holes. Wires, cut to length to fit the wheel circumference, were inserted in the holes, so that after mounting in concave steel felloes, the wire ends could be drawn together, and brazed, thus forming a tire which would not jump-off the rim. Grant's solid rubber tire was placed on the wheel in a rim channel with diverging sides, and was held on the wheel by the two longitudinal wires which formed smaller circles of smaller circumference than the rim flanges.¹

The demand for Grant's product was immediate. Grant, lacking capital, turned to Edwin S. Kelly, a well-to-do Springfield investor. Impressed by Grant's new tire, Kelly agreed to provide the financial backing. In 1894, Kelly and Grant formed a partnership to manufacture and distribute rubber carriage tires. The two men formed the Rubber Tire Wheel Company, and dubbed their original tire the "Kelly-Springfield" tire. Patents for the tire finally were received in 1898.²

Since the Rubber Tire Wheel Company did not have a manufacturing facility, the first Kelly-Springfield tires were made by the B.F. Goodrich Company. Kelly reported putting the first set of Kelly-Springfield tires on carriage wheels in March 1894 and by 1896, 45,000 sets of Kelly-Springfield tires were in use. By 1899, the Rubber Tire Wheel Company had eight sales branches around the world and approximately 50 licensees. In 1899, the five year old Rubber Tire Wheel Company was purchased by a New York syndicate headed by Emerson McMillin for \$1.2 million, and renamed the Consolidated Rubber Tire Company. Upon the sale of the Rubber Tire Wheel Company, Grant left the company but Kelly stayed

¹ For a complete history of the Kelly-Springfield Tire Company see Kenneth A. Jackson, *The Kelly-Springfield Story* (Cumberland: The Kelly-Springfield Tire Company, 1988).

² Jackson, *The Kelly-Springfield Story*, 1-21; "Kelly Making Tires 50 Years," *Tires* (May 1944): 42; "Cumberland Plant Marks 60th Year," *Today* (April 1981): 1; *Kelly-Springfield Tires, 1894-1944* (Cumberland: The Kelly-Springfield Tire Company), 1-4.

on during the transition period. Ultimately, Kelly became the vice president and general manager of the Consolidated Rubber Tire Company.³

By the early twentieth century, the automobile began replacing the buggy as the obvious market for tires. When Kelly sold the Rubber Tire Wheel Company to Consolidated, one of his main goals was to secure a tire manufacturing facility. As manager of Consolidated, Kelly first established the Buckeye Rubber Company, a New Jersey corporation, and bought a site in Akron, Ohio for the erection of a factory. In the same year, Kelly bought the Columbia Pneumatic Wagon Wheel Company, looking ahead to the time when pneumatic tires would replace solid rubber tires.⁴

Edmund Kelly continued to work for Consolidated until 1905. By this point he had ceased to have any authority in the company and his holdings had dwindled to five shares. Kelly returned to Springfield from New York and became involved in a number of other companies.

Emerson McMillin passed control of Consolidated to Van H. Cartmell in 1903. Cartmell, also from Springfield, had been a Kelly family friend and worked under Edmund Kelly at the Rubber Tire Wheel Company. Cartmell took over the Boston, and later, the New York sales territories for the Rubber Tire Wheel Company. After Consolidated bought the company, he worked his way up to the presidency in 1903, an office he held until 1920. Cartmell's presidency was a time of tremendous growth for the company as it went from controlling the solid rubber carriage tire trade to introducing a series of pneumatic tires.

In 1907, Cartmell authorized Buckeye Rubber Company to expand its Akron plant to produce pneumatic tires for automobiles. Consolidated introduced its first pneumatic tire in 1908 and by the end of the year, facing underproduction. As a result, Buckeye was urged to increase production. Faced with increasing demands for pneumatic tires, Consolidated acquired additional facilities in Wooster, Ohio and Buffalo, New York.⁵

In addition to its interest in pneumatic tires, Consolidated continued to manufacture solid rubber tires. In 1909 Consolidated reported record sales of solid rubber carriage tires, however, trucks were becoming the primary market for solid tires. Consolidated's experience in the manufacture of solid tires led to improvements in tire construction. The result was the Kelly-Springfield sectional black tire, introduced in 1909. Later called the Caterpillar, the product became the leading truck tire in the industry. With its new tire, Consolidated soon was dominating the solid tire market, making solid tires not only for trucks but also for tractors and other farm equipment. The company continued to produce solid tires until the late 1930s.

Although the trade name Kelly-Springfield was known worldwide by 1910, no company existed by that name. The Grant carriage tire was known as the "Kelly-Springfield" tire and the name had stuck to tires manufactured by the Buckeye Rubber Company. In 1911, Consolidated's New York sales subsidiary officially adopted the name Kelly-Springfield Tire Company. However, the parent corporation remained Consolidated Rubber Tire Company. Two years later, a Canadian sales subsidiary was founded as the Kelly-

³ Jackson, *The Kelly-Springfield Story*, 33-37.

⁴ A pneumatic tire was first patented in England in 1845. The first pneumatic tire consisted of a non-stretchable outer cover and an inner tube of rubber to hold air. Pneumatic tires for automobiles were not common until the twentieth century.

⁵ "Cumberland Plant Marks 60th Year," 1; "Kelly Making Tires 50 Years," 42.

Springfield Tire Company, Ltd. The parent corporation continued as the Consolidated Tire Company until 1914 when it, too, changed its name to the Kelly-Springfield Tire Company.⁶ Kelly-Springfield's main company offices remained in New York City.

Kelly-Springfield Relocates to Cumberland

Kelly-Springfield remained a relatively small company until the beginning of World War I. Then, with a new line of pneumatic automobile tires and an assortment of solid rubber truck tires, the company began to expand. By 1916, Kelly-Springfield was selling more tires than could be produced at their older Wooster, Akron, and Buffalo plants. A large factory became a necessity. Company officials wanted to build a plant that could produce five times as many tires as the Akron plant. Kelly-Springfield officials sought a location away from Akron's high labor costs, yet close to the company's primary markets in the eastern U.S. According to company records, 53 cities located in Indiana, Ohio, Michigan, Pennsylvania, West Virginia, Maryland, New York, and New Jersey, competed for the plant. After an exhaustive search by two teams composed of Kelly-Springfield officials, a list of eight potential sites was drawn up. Cumberland, Maryland was at the top. Negotiations to bring Kelly-Springfield to Cumberland began in early 1916 in New York City, with Cumberland's former mayor, George G. Young of the Chamber of Commerce, acting for Cumberland. Ten months of negotiations finally ended on 4 November 1916, when Kelly-Springfield signed a contract agreeing to move their manufacturing operations to Cumberland.

The combined efforts of civic organizations, city government, the press, and interested citizenry influenced the decision to move the Kelly-Springfield plant to Cumberland. Leading the charge was the Cumberland Chamber of Commerce, a very aggressive organization, determined to attract new industries to the city. To support their efforts, the Chamber formed the Cumberland Development Company, with John Keating as president, Charles G. Holzshu as treasurer, and George G. Young as secretary. The purpose of the development company was to organize campaigns to attract new companies, to raise money to entice companies to relocate to Cumberland, and to find suitable sites in Cumberland for industrial development.⁷

As part of their effort to attract Kelly-Springfield to Cumberland, city officials offered an 80-acre site located along the Potomac River near the heart of downtown Cumberland. The site was valued at approximately \$123,690.⁸ To make the site even more attractive, the citizens of Cumberland offered to make any necessary improvements to the plant site, which included laying water lines and building streets, sidewalks, fire connections, and sewers. To finance the improvements, the citizens of Cumberland voted on 5 October 1916 for a \$500,000 bond issue. Of the 3,434 votes cast in the special municipal election, only 153 voted against the bond issue.⁹ According to the Cumberland *Daily News*, the announcement of the results of the election was followed by a parade "starting at 10 o'clock and lasting till midnight. Two

⁶ Jackson, *The Kelly-Springfield Story*, 65-73; "Kelly Making Tires 50 Years," 42-44.

⁷ Harry I. Stegmaier, Jr. *Allegany County: A History* (Parsons, West Virginia: McClane Publishing Company, 1976), 323.

⁸ Jackson, *The Kelly-Springfield Story*, 82.

⁹ *The Kant Slip* 2 (December 1916): 35-36.

hundred automobiles formed an impromptu parade through the city as soon as the result became known. Tooting their horns they sped through the city announcing the tidings."¹⁰

When Kelly-Springfield finally selected Cumberland as the site for their next plant on 10 September 1916, company officials pointed not only to the 80-acre site and the \$500,000 bond as key factors in their decision, but also mentioned a number of other attractive features as well. An extra edition of the *Evening Times* on 10 September 1916 told the story of Kelly-Springfield's decision to build its plant at Cumberland. Kelly-Springfield selected Cumberland as the site for its new production facility for several reasons. First, Cumberland was located near Eastern tire markets. According to press releases issued by Kelly-Springfield, over half of the U.S. population in 1917 was within one day's driving distance of Cumberland. Second, Cumberland's proximity to West Virginia and Maryland coal fields assured Kelly-Springfield an ample supply of fuel, while the Potomac River would furnish any water supplies that Kelly-Springfield might need in the manufacturing process. Third, Cumberland was a major railroad center. At the time of plant construction the city was served by five railroads - the Pennsylvania; the Baltimore and Ohio; the Western Maryland, Georges Creek and Cumberland; the Huntington and Broadtop; and the Cumberland and Pennsylvania. In addition, the Baltimore and Ohio Railroad agreed to run a portion of their tracks alongside the Kelly-Springfield plant.

Finally, the city of Cumberland offered a number of financial incentives to Kelly-Springfield. Not only was the 80-acre site free, but both city and county taxes were waived for a period of 10 years. The greatest financial incentive, however, was the \$750,000 offered to Kelly-Springfield by the citizens of Cumberland as a cash bonus for building their plant in Cumberland.

The cash bonus became the deciding factor in selecting Cumberland. It was a half million dollars higher than the next offer. Combined with the tax savings of over \$71,000 per year, \$1,500,000 in labor savings, and an estimated savings of \$750,000 in greater production efficiency at the new plant, Cumberland seemed to offer the perfect match for the new plant.

News of Kelly-Springfield's selection of Cumberland was released on 10 September 1916. The next morning on 11 September 1916 headlines from local newspapers read "TIRE PLANT ACCEPTS CUMBERLAND'S OFFER: WILL LOCATE BIG PLANT HERE IF BONUS IS GUARANTEED IN 30 DAYS" and "TIRE PLANT AGREEMENT SIGNED: KELLY-SPRINGFIELD COMPANY FORMALLY ACCEPTS CUMBERLAND'S OFFER AND WILL LOCATE THE 3000-MAN FACTORY IN THIS CITY UPON THE GUARANTEE OF \$750,000 AND A FREE SITE."¹¹ According to news releases, the \$750,000 was required in three payments, one-third within a month after the final signing of an agreement, one-third in approximately 90 days, and the balance at the completion of the plant, which was estimated at the time to take approximately 18 months. Kelly-Springfield required that Cumberland be able to guarantee the money within 30 days.

Almost immediately after Kelly-Springfield's announcement, the Chamber of Commerce sprung into action in an effort to secure the \$750,000 within 30 days. The Cumberland Chamber of Commerce mounted a large scale advertising campaign to raise the necessary funds. Local newspapers urged and pressured the citizens of Cumberland to do "your part," and to think what the Kelly-Springfield plant "means to your

¹⁰ Cumberland *Daily News*, 6 October 1916.

¹¹ Cumberland *Daily News*, 11 September 1916; Cumberland *Evening Times*, 11 September 1916.

children and your children's children."¹² According to a news release in the *Evening Times* "it's now up to you, Mr. and Mrs. Citizen, as to whether this amount of money will be raised within the time set. The large amounts have already been contributed. It's the small contributions that will count now. It's YOUR share that's going to decide this big question. It's YOUR contribution, small or large, that is going to count for most from now on."¹³

In order to raise the \$750,000, stock subscriptions to the Cumberland Development Company were sold. Dividends would be paid when land purchased by the Development Company was improved and sold. Throughout September and early October 1916, the Chamber of Commerce and the Development Company worked around the clock securing subscriptions. Each day the *Cumberland Evening News* ran a complete list of all new subscribers, along with the amount they pledged.¹⁴ Businesses and individuals alike responded to the subscription drive and on 3 October 1916, three weeks into the campaign, it was announced that the \$750,000 had been raised.

Ground for the new Cumberland facility was broken on 11 April 1917. During the ceremonies, President William Sperry of the Chamber of Commerce said "on this bright and beautiful morning, a token of brighter, greater, and I trust happier days for Cumberland we are ready to commence something. In all earthly things there is always a beginning, and so today we will see the beginning of the erection of the great tire plant of the Kelly-Springfield Tire Company."¹⁵

Formal work on the plant began when George Young, in the presence of more than 200 persons, lifted a shovelful of earth from a section of ground where the main building would stand. The ceremonies were opened with a prayer by Reverend M.L. Enders, pastor of St. Paul's English Lutheran Church. After brief speeches were made by Mayor Thomas Koon, President Sperry, and Secretary Young, a parade of approximately 40 cars paraded through downtown Cumberland.¹⁶

The engineering company selected for the Cumberland facility was S. Diescher & Sons of Pittsburgh, Pennsylvania. This firm was established in 1901 by Samuel Diescher (1839 - 1915), an Hungarian-born engineer. Following his arrival in the United States in 1866, Diescher was involved in the design of coke plants, coal-washing plants, inclined planes, street railways, and specialized machinery. Most of his work was conducted in the Pennsylvania region. Diescher's sons, Samuel E. and August P., who were trained

¹² "Will You Be Weighed in the Balance and Found Wanting?" *Cumberland Evening Times*, 12 September 1916.

¹³ "Will You Be Weighed in the Balance and Found Wanting?" *Cumberland Evening Times*, 12 September 1916.

¹⁴ During this 30-day period the Cumberland newspapers were dominated by headlines that read "Campaign For Tire Plant Subscription Underway"; "Big Committee Named To Bring Subscription Campaign to a Finish"; "Subscriptions For Tire Plant Nearing \$550,00". See *Cumberland Evening News*, 15 September 1916; *Cumberland Evening News*, 16 September 1916 and *Cumberland Evening News* 18 September 1916.

¹⁵ For the full text of President Sperry's speech see the *Cumberland Evening News*, 11 April 1917.

¹⁶ "Ceremonies Mark Formal Start of Work on Great Tire Plant," *Cumberland Evening Times*, 11 November 1917.

by their father, continued the business after the elder Diescher's death in 1915.¹⁷ The sons were responsible for the design work carried out for Kelly-Springfield.

The architect Edward Necarsulmer (1874 - 1959) of New York City acted as consulting architect for the Cumberland facility.¹⁸ Necarsulmer received his architectural degree from Columbia University in 1896 and continued his architectural training at the Ecole des Beaux Arts in Paris between 1898 and 1902.¹⁹ In 1903, Necarsulmer founded his own architectural practice in New York City. During his career, Necarsulmer was involved in commercial, industrial, institutional, and residential work. In addition to plans for the tire plant, Necarsulmer was responsible for the design for the Kelly-Springfield Tire Company building at 57th Street and Seventh Avenue in New York City.²⁰

Although construction began on the Kelly-Springfield Tire Plant in 1917, World War I delayed plant construction for four years. The first plant unit - the mechanical building - was not completed until the end of 1918. The intake building and pump house were finished in 1919, the power house, garage, hospital, and laboratory buildings in 1920, and, in January of 1921, the shell of the main factory building was completed.²¹

The main factory building was the largest building in the complex. When constructed, the building consisted of a header building, measuring 760 feet long by 120 feet wide, and five wings joined to the header building. Each wing measured 430 by 60 feet.²²

The power house was equipped with six boilers, capable of providing 9,000 to 12,000 horsepower. In addition, the building was outfitted with large turbines, condensers, motor generator sets, and pumps. The circulating pumps were capable of pumping 30 million gallons of water per day.²³

¹⁷ *History of Pittsburgh and Environs* (New York: The American Historical Society, 1922), 93-4.

¹⁸ "Mechanical Features of Tire Factory," *The Iron Age*, 17 November 1921; Edward Necarsulmer obituary, *New York Times*, 8 December 1959.

¹⁹ George S. Koyl, ed., *American Architects Directory* (New York: R.R. Bowker Co., 1955), 401; James Ward, *Architects in Practice in New York City, 1900-1940* (Union, NJ: J&D Associates, 1989), 56. These sources consulted at the Library of the American Institute of Architects, Washington, D.C. indicated that Necarsulmer was a member of the American Institute of Architects from 1911 until his death in 1959.

²⁰ *Catalog of the Avery Memorial Architectural Library of Columbia University* (Boston: G.K. Hall & Co., 1968). A reference was made to a pen and ink sketch by Necarsulmer of the Kelly-Springfield Tire Company Building at 57th Street and Seventh Avenue in New York City. The sketch is on file at Columbia University's Avery Library. No construction date for the drawing or building was indicated.

²¹ James W. Thomas and Judge T.J.C. Williams, *History of Allegany County Maryland* (Baltimore: Regional Publishing Company, 1969), 432; "Kelly Making Tires 50 Years," *Tires* (May 1944): 43.

²² "Kelly-Springfield Tire Company Now in Production, The Greatest Asset of Cumberland's Industrial Sphere," *Cumberland Daily News*, 30 July 1921, Industrial Edition; Thomas and Williams, *History of Allegany County Maryland*, 432-433.

²³ *The Kant Slip* 6 (June 1921): 43-47.

The pump house was equipped with a complete assortment of standard and special pumps, ranging from a five hundred gallon to a six million-gallon compound pump, along with accumulators, air compressors, and tanks. Water was taken from the Potomac River through seven-foot tunnels and directed to the pump house. The water intake house, located on the bank of the Potomac, contained four screens, each 30 feet long, which screened the water before it flowed into the pump house.

The machine shop, the first building completed, was a U-shaped structure which comprised two wings, each 160 feet by 46 feet, connected by a core structure measuring 40 feet by 34 feet. It contained machine, blacksmith, and carpenter shops, as well as a large number of boring mills for the manufacture of molds and cores used in the building and vulcanizing of tires.²⁴

Because of the importance of chemical and mechanical research in the tire industry, Kelly-Springfield paid special attention to the layout and design of its laboratory building. This building was 300 feet long and contained various equipment, including rubber mills, fabric calendering machines, and vulcanizers. In addition, the building contained a number of laboratory rooms.²⁵

The Cumberland facility also contained a two-story garage with space for 110 cars; a fully-equipped and staffed hospital; and a number of smaller auxiliary buildings. The entire plant was protected by an automatic sprinkler system and fire hydrants. Overall, 12 acres were covered by buildings. The plant contained 22 acres of floor space, 19 of which was devoted to manufacturing. The total cost of the plant was approximately \$12 million.²⁶

Five years after negotiations between Kelly-Springfield and the Cumberland Development Commission began, the Cumberland plant began production. The plant officially went into operation on 2 April 1921, when the first tire was produced - a Kelly Kant Slip, size 33 x 4. On 23 April 1921, Kelly-Springfield held an open house to show off its new Cumberland facility, and it was estimated that over 10,000 local residents toured the new plant.²⁷

The new Kelly-Springfield plant helped to revitalize a sagging Cumberland and Allegany County economy. Much of Allegany County's economy was based on extractive industries, such as coal mining and lumbering. By the early 1920s, the Pittsburgh coal vein, the main seam of coal running through the region, was nearly depleted, and Allegany County coal operators were facing stiff competition from other coal-producing regions. According to a history of Allegany County, 1920 was the last prosperous year for the coal industry in Western Maryland.²⁸ Between 1924 and 1930, 27 area coal companies went out of

²⁴ *The Kant Slip* 6 (June 1921): 43-47; Thomas and Williams, *History of Allegany County Maryland*, 431-432.

²⁵ *The Kant Slip* 6 (June 1921): 43-47; "Kelly-Springfield Tire Company, Now in Production, The Greatest Asset of Cumberland's Industrial Sphere," *Cumberland Daily News*, 30 July 1921.

²⁶ "Kelly-Springfield Tire Company, Now in Production, The Greatest Asset of Cumberland's Industrial Sphere," *Cumberland Daily News*, 30 July 1921.

²⁷ *The Kant Slip* 6 (June 1921): 43-44.

²⁸ Stegmaier, *Allegany County: A History*, 233.

business. By 1930, many of the remaining companies were relatively small; 41 of the 72 firms still in operation employed under 10 people.

In addition, the systematic exploitation of the region's forests helped to undermine the area economy. By 1912, 99% of the virgin forest in Allegany County was gone, and the absence of reforestation assured that the lumber industry would soon vanish from the region.

The Kelly-Springfield Tire Plant was one of the main reasons that Cumberland did not sink into an economic abyss during the 1920s. Kelly-Springfield's significance to the Cumberland area can be seen in its effect on the local economy. Employment opportunities at the plant during the early 1920s helped to soften the economic blow of the decline of the extractive industries in the Cumberland area. One of the many local industries that benefitted from the plant was the construction industry. In addition to the plant, new housing was built for workers and their families. Concerned about employee housing, Kelly-Springfield incorporated a new company, the Cumberland Homes Company, to design and build company housing. The new company was funded in part by local citizens who provided \$50,000 and in part by Kelly-Springfield who provided an additional \$50,000. Between 1919 and 1923, the Cumberland Homes Company constructed over 119 houses. Two new Cumberland hotels, the Boulevard Hotel and the Fort Cumberland Hotel, also appeared as a result of the new factory.

Kelly-Springfield furthered its commitment to Cumberland in 1922 when the company's manufacturing administration offices were moved from Kelly Avenue in Akron, Ohio to Kelly Boulevard in Cumberland. Soon after the Cumberland plant opened in 1921, the Kelly-Springfield plant at Wooster, Ohio closed. The Buffalo plant was sold in 1922 and the Akron plant was closed in 1925. By this time, Kelly-Springfield was firmly entrenched in Cumberland. Both its administrative offices and production facilities were located there.

Goodyear Takes Charge

During the 1920s the nation's vast productive capacity burst forth with a tide of automobiles, radios, electrical appliances, and other consumer goods. The wave of new products brought a glow of prosperity to the economy and far reaching changes in the lives of ordinary Americans. Ingrained patterns of diet, dress, housekeeping, travel, entertainment, and even thought changed as a consequence of fundamental transformations in society.

The technological changes of the 1920s, which came on the heels of several decades of immigration and rapid urban growth, also spawned severe social tensions. Deep conflicts over immigration, religion, and prohibition ripped at the fabric of society. When the decade ended, Americans tried to sum up the turbulent, chaotic, and sometimes contradictory decade as either the "Roaring Twenties" or the "Age of Anxiety."

These two labels, "Roaring Twenties" and "Age of Anxiety," as well as contradictory and chaotic, are also appropriate to describe the Kelly-Springfield Tire Corporation during the period. On one side, Kelly-Springfield was participating in the mass consumerism spawned by national advertising campaigns, while on the other side they were facing severe financial losses.

Advertising spawned much of the mass consumerism that took place during the 1920s. Although national advertising began with the emergence of brand names in the late nineteenth century, it did not achieve the importance it now holds until the 1920s. Like their counterparts today, the advertisers of the twenties used celebrity endorsements, promises of social success, and threats of social embarrassment.

Auto makers, manufacturers of radios, washing machines, and other electrical equipment, as well as companies making toothpaste, and shampoo also relied on massive advertising to sell their products.

Kelly-Springfield was on the forefront of the 1920s advertising campaigns. One largely circulated magazine ad pictured Queenie Smith of the Metropolitan Ballet dancing inside a large Kelly Tire. In another, the Harvard football team was photographed on its way to the playing field in a car outfitted with Kelly tires. In still another ad, Dorothy Kelly, an early film star, endorsed Kelly tires. The largest Kelly-Springfield advertising campaign began in 1912 and centered around several female models, each one known as "Lotta Miles." The "Lotta Miles" campaign consisted of magazine and billboard advertisements, with various poses of the model and a Kelly-Springfield tire. The smiling Lotta Miles model and the "Hand Made" slogan were also featured on the first series of the electric-lighted "spectacular" signs ever used in tire advertising. For many years the Kelly-Springfield electric sign, with a squirrel running inside a whirling tire, was one of the landmarks of Broadway above Times Square in New York City.²⁹

Despite Kelly-Springfield's advertising campaigns, the "Age of Anxiety" characterized much of the twenties for the company. With the lengthy construction of the Cumberland plant, the company began to experience serious financial problems, reporting its first significant loss in the 1921 annual report of \$506,959.97.³⁰ Other serious problems, including the quick turnover of top level management, fluctuating raw rubber prices, and cut-throat competition with Goodyear and Firestone, also faced the company. The company's future was in jeopardy in the late 1920s. By 1928 Kelly-Springfield was losing close to one million dollars a year, and these losses continued during the ensuing years.³¹

With the stock market crash in October 1929, and the economic depression that followed, demand for tires fell sharply. After several years of unprofitable operation, stockholder dissension prompted changes in management. William H. Lalley became president of Kelly-Springfield in March 1931 and was immediately faced with internal dissension from stockholders. Continued losses in the early 1930s ultimately forced Kelly-Springfield into receivership in the spring of 1934. In 1934 Kelly-Springfield was involved in three different cases of receivership - in New Jersey, New York and Maryland.³²

The man that led Kelly-Springfield out of receivership was Edmund S. Burke. Prior to joining Kelly-Springfield, Burke had spent much of his career in the tire manufacturing industry. At the age of 18 he joined Fisk Rubber Company, ultimately becoming assistant to the president. Just prior to joining Kelly-Springfield, Burke worked for the Chrysler Corporation as assistant to the president. In January 1934, Burke joined Kelly-Springfield as vice-president and general manager. On July 5, 1934, Burke became president of Kelly-Springfield. Burke was receiver in all three receivership cases; his plan for reorganizing Kelly-Springfield was approved by the court. One of the most serious problems facing Kelly-Springfield was decentralized operations; the corporate headquarters in New York City were located 400 miles from the Cumberland factory.

²⁹ "Kelly Making Tires 50 Years," 44.

³⁰ 1921 Kelly Springfield Annual Report, Kelly-Springfield Archives, Cumberland, Maryland.

³¹ Stegmaler, *Allegany County: A History*, 354-355; "Kelly Making Tires 50 Years", 44; Jackson, *The Kelly-Springfield Story*, 93-96.

³² Jackson, *The Kelly-Springfield Story*, 97-98.

To deal with Kelly-Springfield's financial and organizational problems, Burke cut the work schedule at the Cumberland plant to three days a week, and he moved Kelly-Springfield's executive offices from New York to Cumberland. Under Burke's leadership, Kelly-Springfield's situation stabilized. By 1935, Burke recognized that the best solution to Kelly-Springfield's difficulties was a merger with another tire manufacturer. In August 1935, Burke helped to negotiate the sale of Kelly-Springfield to the Goodyear Tire and Rubber Company.³³

Goodyear paid approximately \$4.5 million for the Cumberland plant. According to Cumberland officials at the time, the purchase called for Kelly-Springfield stockholders to receive 80% of the value of their holdings, while preferred shareholders received \$13 in cash per share and two shares of Goodyear for each five shares of Kelly-Springfield. Holders of the common stock of the Kelly-Springfield Tire Corporation received 62 cents per share, and were assigned one share of Goodyear common stock for every 25 shares of Kelly-Springfield.³⁴

In announcing the sale, Burke said "effective 5 August the Goodyear Tire & Rubber Company assumed financial control of the Kelly-Springfield Tire Company." Burke asserted "the Cumberland company's sales, manufacturing, and advertising operations would be wholly independent. The arrangement is similar to the operations of individual motor car corporations as they are related to their large parent company."³⁵ Burke's vision for Kelly-Springfield was to preserve the company's independence in the marketplace, while sharing materials procurement, and research and development with Goodyear. The idea helped to revive a failing company.

Through calculated statements Burke tried to reassure the citizens of Cumberland about Kelly-Springfield's commitment to the area. "We feel that Maryland offers an ideal location for the continuation of our plant operation," Burke said. "Around Cumberland are some of the world's best proving grounds for tires."³⁶ Burke stressed that the Cumberland plant "would be manned as far as possible by Cumberland workers, and that old employees would be given preference in development of plans for the plant's future operation."³⁷

Burke remained president of Kelly-Springfield, retained key personnel of the old Kelly company, and strengthened management positions with Goodyear personnel. Under the new ownership, increased orders soon had the plant operating five days a week. Between August 1935 and June 1936 Kelly-Springfield's

³³ "Cumberland Plant Marks 60th Year," 3-4; "Kelly Making Tires 50 Years," 43; "Goodyear President Says Sales Increase," *Cumberland Sunday Times*, 28 July, 1935; "File Deeds, Transfer of Kelly Tire Assets," *Cumberland Evening Times*, 13 August 1935; M.J. French, "The Emergence of a US Multinational Enterprise: The Goodyear Tire and Rubber Company, 1910-1939," *Economic History Review* 40 (1987): 64-77. For a more in depth discussion of Goodyear's acquisition of Kelly-Springfield see Hugh Allen, *The House of Goodyear: Fifty Years of Men and Industry* (Cleveland: The Corday & Gross Company, 1949).

³⁴ "Transfer of Kelly Plant is Completed," *Cumberland Evening Times*, 10 August 1935.

³⁵ "Kelly To Remain At Cumberland," *Cumberland Evening Times*, 12 August 1935.

³⁶ "Kelly to Remain at Cumberland," *Cumberland Evening Times*, 12 August 1935.

³⁷ "Transfer of Kelly Plant is Completed," *Cumberland Evening Times*, 10 August 1935.

losses dropped to \$200,000. By 1937, the transformation of Kelly-Springfield was complete. Kelly-Springfield had a profitable year – the first since the Cumberland factory opened.³⁸

Under Burke's leadership Kelly-Springfield continued to expand during the late 1930s. His approach towards manufacturing was to maintain a small, profitable company by limiting production to the Cumberland plant. In 1938, Kelly-Springfield introduced its first custom brand tire – the "vogue," a premium brand tire sold in Cadillac and other upscale car dealerships. Also, as the gasoline service station market was rapidly expanding, Burke made arrangements with several oil companies for the retail sale of Kelly-Springfield brand tires.

During the mid to late 1930s, Kelly-Springfield expanded its line of products produced from rubber. Walking canes, seat cushions for office and home furniture, soles for shoes, bicycle inner tubes, air bladders for footballs, and even a "Kiddy Kelly" doll, which was made mostly of rubber, were produced at the Cumberland plant. By the time the U.S. entered World War II in December 1941, Kelly-Springfield was on solid financial ground.

Unlonization

Two factors changed the national labor picture in the mid-1930s. One was the National Labor Relations Act, and the other the formation of the Congress of Industrial Organizations, the CIO. In 1933, Congress passed and President Roosevelt signed the National Industrial Recovery Act (NIRA) which established the National Recovery Administration, or the NRA.³⁹ The purposes of the NRA were two-fold: first, to stabilize business with codes of "fair" competitive practice, and second, to generate more purchasing power by providing jobs, defining labor standards, and raising wages. The NIRA stirred controversy because of "Section 7A" of the act, which gave labor the right to organize and bargain collectively with employers. Under Section 7A, the National Labor Board (NLB) was established. The Board was to hold elections among the workers in a particular plant, mill, or mine to choose their representatives; the organization which won the majority of votes would exclusively represent all the workers.

Many companies simply ignored Section 7A; others circumvented it by forming company unions. Moreover, the difficulty of enforcing the Labor Board's decisions, coupled with the 1935 Supreme Court decision that the NIRA was unconstitutional, led to the Wagner National Labor Relations Act of 1935. Introduced in February 1935 by Senator Robert Wagner, the National Labor Relations Act (or Wagner Act as it is sometimes called) established the National Labor Relations Board (NLRB). The Wagner Act effectively gave statutory authority to the NLB. Not only was a new independent three-man National Labor Relations Board empowered to hold employee elections based on majority rule and exclusive representation;

³⁸ Jackson, *The Kelly-Springfield Story*, 104.

³⁹ Much of the information on the National Industrial Recovery Act, the National Labor Relations Act, and the organizing drives of the Congress of Industrial Organizations can be found in Anthony J. Bader, *The New Deal: The Depression Years, 1933-1940* (New York: The Noonday Press, 1989), 118-146; Daniel Nelson, "Origins of the Sit-Down Era: Worker Militancy and Innovation in the Rubber Industry, 1934-38," *Labor History* 23 (Winter 1982): 198-225; Harold S. Roberts, *The Rubber Workers: Labor Organization and Collective Bargaining in the Rubber Industry* (New York: Harper & Brothers Publishers, 1944); Richard Walsh and William Lloyd Fox eds., *Maryland: A History, 1632-1974* (Baltimore: Maryland Historical Society, 1974), 756-757.

but the Act also outlawed company unions and provided unions with redress against a whole series of unfair employer tactics including discriminatory discharge, espionage, blacklisting, and unfair propaganda.

Under the impetus of Section 7A and the Wagner National Labor Relations Act, labor unions stirred anew. The largest union federation in the early 1930s was the American Federation of Labor, or the AFL. The AFL had organized skilled workers, but had done little to organize unskilled or industrial workers. One of the leaders of the AFL, John L. Lewis of the United Mine Workers, disagreed with the Federation's philosophy, and promoted the organization of workers in the mass-production industries. In 1934, Lewis, along with Sidney Hillman of the Amalgamated Clothing Workers Union, and David Dubinsky of the International Ladies Garment Workers, persuaded the AFL and its president William Green to charter industrial unions in the unorganized industries, including the rubber and automobile industries. On 10 November 1935, Lewis and the leaders of seven other AFL unions met and formed the Committee of Industrial Organization, or CIO, to help with organizing the major industries. Jurisdictional disputes within the AFL and CIO in 1936 led the AFL to expel the CIO unions, which then formed a permanent structure called the Congress of Industrial Organizations after 1938.

The CIO's major organizing drives in the automobile and steel industries began in 1936. Having captured two giants of heavy industry, the CIO went on to organize much of industrial America, including the rubber, oil, electronics, and much of the textile industry.

Cumberland was the scene of a major CIO organizing drive. On 30 August 1936 the CIO announced plans for a unionization drive aimed at Kelly-Springfield. Kelly-Springfield's parent company, Goodyear, had already been organized by the United Rubber Workers. Trouble for Kelly-Springfield began even before the labor rally on 30 August. On 24 August 1936 the United Rubber Workers of America (URW) and approximately 1,700 employees struck the Cumberland plant in an attempt to win company recognition of the union as bargaining agent for company employees.⁴⁰ The URW also asked for wages comparable to those at the Goodyear's Akron plants, improved working conditions, and shorter work hours. Because the walkout had been called so quickly, many of the workers did not learn about it until they reached the plant on the morning of the 24 August. Nonetheless, the walkout proved effective as over seventy-five percent of the workers joined in the action⁴¹.

Workers who crossed the picket lines were greeted by signs reading "Don't Be A Scab, Be A Man," and "We Want 6 Hours - 30 Hour Week." A tent for pickets was set up on a vacant lot near the Boulevard Hotel. Coffee, cold drinks, and food were furnished to the pickets.

One of the strike leaders was W. J. Carney of Akron, an organizer of the Rubber Workers. In an early morning speech, Carney stood on top of an automobile and addressed the crowd. He cautioned against violence or disorder. He also assured the crowd that "no worker would starve while the strike was on, and that pickets would be paid one dollar a day and upward, according to the needs of the striker's family."⁴²

⁴⁰ "Union Local Calls Strike at Tire Plant," *Cumberland Evening Times*, 24 August 1936.

⁴¹ "Union Local Calls Strike at Tire Plant," *Cumberland Evening Times*, 24 August 1936.

⁴² "Union Local Calls Strike At Tire Plant," *Cumberland Evening Times*, 24 August 1936.

Company management criticized the strike. Francis Johnson, Secretary of the Kelly-Springfield Tire Company Employees Union, issued a statement describing the strike as an attempt by "a minority of employees, dominated by outsiders, to deprive a majority of workers the right to earn a livelihood."⁴³ Company president Edward Burke declared "that while a small number did not report for work their places will be filled by new applicants."⁴⁴

To protect the plant from violence, company officials installed large search lights on all the buildings, and along the fencing surrounding the plant. Kelly-Springfield also increased the number of men on the company security force at the plant. In addition, state and local police guarded the plant.

Violence marred the strike late in the afternoon of 25 August. As workers who had crossed the picket line earlier in the day attempted to leave the plant on buses, they clashed with the picket lines. In an effort to end the melee, the state police fired gas bombs and tear gas into the crowd of picketers, which resulted in charges of police intimidation. The Allegany Trades Council protested to Maryland Governor Harry W. Nice against the use of state police. The council condemned the use of state police "to intimidate strikers engaged in peaceful and lawful picketing."⁴⁵

Throughout the last week of August 1936, both company officials and union leaders attempted to work out a strike settlement.⁴⁶ Realizing that unionization was inevitable, officials from Kelly-Springfield ultimately agreed to negotiate with the URW. On 1 September 1936, Local 26 of the United Rubber Workers and Kelly-Springfield reached an agreement providing for the striking workers to return to their jobs on 3 September without discrimination, and recognizing the URW as bargaining agent for the employees.⁴⁷ In the matter of wage increases, Kelly-Springfield argued that the Cumberland plant had operated at a loss of over one million dollars per year since the mid-1920s and that the company was not in any position to increase wages. The company would, however, undertake a study to determine how much of an increase would be possible in the future. According to the agreement, Kelly-Springfield would announce its conclusions within 60 days.

During the fall of 1936, through the efforts of the URW and the September 1936 agreement, employees of Kelly-Springfield received a 5% pay increase. In January 1937, in an attempt to gain further pay increases, workers belonging to Local 26 of the United Rubber Workers Union in Cumberland engaged in a sit-down strike, a favorite tactic of the union. Kelly-Springfield retaliated by laying off the union leaders and bargaining with the company's own union, the Employee Protective Association. In this early test of

⁴³ "Union Local Calls Strike At Tire Plant," *Cumberland Evening Times*, 24 August 1936.

⁴⁴ "Union Local Calls Strike at Tire Plant," *Cumberland Evening Times*, 24 August 1936.

⁴⁵ "Kelly-Springfield Tire Plant Closed By Strike," *Cumberland Evening Times*, 26 August 1936.

⁴⁶ "Kelly-Springfield Management to Meet With Striking Workers to Air Grievances From Union," *Cumberland Evening Times*, 27 August 1936; "Strike Settles Down to Negotiations," *Cumberland Evening Times*, 28 August 1936; "Drafts of Agreements Offered in Kelly Strike Negotiations," *Cumberland Evening Times*, 31 August 1936; "Tire Plant Strike Remains Unchanged," *Cumberland Evening Times*, 1 September 1936.

⁴⁷ "Kelly Company Strike Settled; Tire Plant Will Deal With Union Men," *Cumberland Evening Times*, 2 September 1936.

its commitment to workers, the National Labor Relations Board found that Kelly-Springfield had not engaged in collective bargaining as guaranteed under federal law. They ordered the company to disband the company union, to reinstate the union employees with back pay, and to post notice that it intended to comply with the Wagner Act. Consequently, as a direct result of the sit down action taken in January 1937 and the National Labor Relations Board ruling, workers at the Cumberland facility received another pay increase of approximately 6% in February 1937. The URW represented the workers at Kelly-Springfield until the Cumberland plant stopped operations in 1987.

World War II and Mobilization at Home

The attack on Pearl Harbor by the Japanese on 7 December 1941 shook America to its inner core. Coupled with Nazi aggression in Europe, the Japanese attack highlighted the fact that the American military, as well as American industry, were unprepared for war. Within one year, however, American industry as well as its armed forces, had mobilized. American victory over the Japanese and Nazis was made possible by business-government cooperation. Shortly after Pearl Harbor, President Franklin Roosevelt called upon the American people to produce in 1942 an unprecedented 60,000 planes, 45,000 tanks, 20,000 anti-aircraft guns, and immense quantities of other supplies for the American and Allied fighting forces.

Ten days after the attack on Pearl Harbor Congress had enacted the War Powers Act of 18 December 1941 giving the President a mandate to reorganize government agencies. A Second War Powers Act, of March 1942, empowered the government to allot materials and facilities for defense, with penalties for those who failed to comply.⁴⁸ To oversee and organize this herculean effort, Roosevelt established The War Production Board (WPB). Created in January 1942, the WPB was the primary government agency in charge of directing industrial conversion to war production. Its tasks included allocating scarce materials, limiting or stopping the production of civilian goods, and distributing government contracts among competing manufacturers.

It was clear from the beginning that a successful war effort would require all of America's huge productive capacity and full employment of the work force. Consequently, American factories quickly expanded their employment rolls and retooled their machinery. By February 1942, war production was beginning to take shape. According to one business leader America's war effort was "not so much industrial conversion as industrial revolution, with months and years condensed into days." Automobile manufacturers in Detroit retooled to produce tanks and airplanes; a merry-go-round factory switched to fashioning gun mounts; makers of shirts produced mosquito netting; and the makers of refrigerators and stoves retooled to produce munitions.

The Kelly-Springfield plant at Cumberland was one large industrial facility to convert from industrial production to war production. Even prior to the attack on Pearl Harbor, Kelly-Springfield was feeling the impact of Japanese aggression in the South Pacific. Japanese occupation of natural rubber-producing areas, combined with the difficulty of producing and transporting rubber from countries at war, made it

⁴⁸ For information on World War II and its impact on politics and American culture and business see John Morton Blum, *V Was For Victory: Politics and American Culture During World War II* (New York: Harcourt Brace Jovanovich, Publishers, 1976.)

almost impossible to continue tire production. By December 1941 tire production had come to an almost complete stop at the Cumberland facility. Production sagged to two or three days per week.⁴⁹

In the span of six months, the Cumberland operation was transformed from a tire factory into an ammunition factory.⁵⁰ With its considerable plant floor space, power, and water facilities, the Cumberland plant seemed ideal as a munitions factory. Ultimately, the Cumberland plant was the production site of eight-inch M106 shells and later .50 caliber shells.

On 27 December 1941, Kelly-Springfield received an invitation from the Army Ordnance Department to submit a proposal for the manufacture of a "substantial quantity" of eight-inch, high-explosive M106 shells. The bid was to include estimates of equipment costs, installation costs, equipment delivery dates, and the price of machined and heat treated shells. The forging was to be furnished by the government, and the components by Kelly-Springfield. Later, Kelly-Springfield also was requested to furnish the forging, and the contract price was adjusted accordingly.

Kelly-Springfield executives had limited, if any, knowledge of shell production. Since the bid was to be submitted within 11 days, company officials from Kelly-Springfield's Engineering, Cost Accounting, and Production Departments, hastily visited several plants involved in the production of eight-inch shells. In addition, representatives of companies that manufactured machinery used to produce shells were summoned to Cumberland. These representatives were requested to bring data on the guaranteed daily capacity of their machinery, prices, and delivery dates. In addition, data on the durability of the equipment, along with cost and daily capacity were considerations in the selection of equipment.⁵¹

Kelly-Springfield's bid was accepted, and on 31 January 1942, the company was awarded a contract to manufacture eight-inch M106 shells. In order to obtain the necessary machinery and equipment at the earliest possible date, Kelly-Springfield established the Expediting Department to contact manufacturers by letter, phone, and in person if necessary. Despite their best efforts to retool the tire plant quickly, Kelly-Springfield's task was made increasingly difficult by the growing demand for machinery in munitions plants around the country. According to reports issued by Kelly-Springfield, orders placed for machinery on 3 February 1942 and 3 March 1942 did not arrive until 12 June 1942 and 25 August 1942 respectively. By 1 September 1942, after months of delays caused by breakdowns in equipment delivery and trouble-shooting, Kelly-Springfield called in its production crews for training. Training of personnel and supervision was accomplished in a short time with the cooperation of the various machinery suppliers. After one month of instruction and training, Kelly-Springfield began production of eight-inch M106 shells in October 1942. This manufacturing operation was conducted in the basement of one wing of the main plant and in special buildings erected to house the heat treating operation. Ultimately, Kelly-Springfield earned the Army-Navy

⁴⁹ Jackson, *The Kelly-Springfield Story*, 112.

⁵⁰ "Kelly Making Tires 50 Years," 43; "Cumberland Plant's 66-Year Career Ends," *Today* (May 1987): 1-4; *Thirty-Fifth Anniversary: Kelly-Springfield Cumberland Plant* (1955): 15-16.

⁵¹ Information on Kelly-Springfield's role in World War II can be found at the company's headquarters in Cumberland. The company archives included the following short histories: "The Kelly-Springfield Tire Company's History of Ordnance Production"; "History of Shell Manufacturing During World War II at The Kelly-Springfield Tire Company, Cumberland, Maryland"; "History of the Allegany Ordnance Plant from 1942-1943"; *From Armorubber to Armor-Piercing Bullets* (Cumberland: Kelly-Springfield Tire Company, 1944.)

highest efficiency award for its M106 production. When the eight-inch shell contract was terminated in July 1945, Kelly-Springfield had produced 383,795 eight-inch shells.

The Cumberland plant also was the production site of .50 caliber shells.⁵² During the spring of 1942, Kelly-Springfield officials tirelessly worked to convince the government that they had the organization and space (half a million square feet of floor space at the Cumberland plant) to manufacture additional ammunition. Limited rubber manufacturing continued and the production of eight-inch artillery shells for the Pittsburgh Ordnance District already was underway in the same building. On 16 March 1942, Kelly-Springfield organized and incorporated The Kelly Springfield Engineering Company to operate the Allegany Ordnance Plant, as the tire plant became known during the war. The Kelly-Springfield Engineering Company then leased from the Kelly-Springfield Tire Company the available buildings at the Cumberland site for the manufacture of small arms ammunition.

Although the Cumberland plant ultimately produced .50 caliber shells, the first contract awarded to the plant was for .30 caliber shells. On 10 April 1942 the Kelly Springfield Engineering Company entered into a formal cost-plus-a-fixed-fee contract with the U.S. government to manufacture .30 caliber shells. According to the contract, the Kelly Springfield Engineering Company was "to furnish consultant service covering consultation with and advice to the architect engineer and constructor regarding the adequacy of design, engineering and construction; procure equipment and install such equipment at the project; and operate the new ordnance facility for the manufacture of .30 caliber ammunition."⁵³ Except for designated spaces in the factory used in the manufacture of the M106 shells, the power plant, and certain areas in the main building which were being used for offices, a cafeteria and storage, Kelly Springfield Engineering Company leased the entire Cumberland facility.

The Allegany Ordnance Plant comprised two facilities: the main plant and the powder farm. The main plant consisted of the Cumberland tire manufacturing complex, while the powder farm, located in Mineral County, West Virginia approximately nine miles from the main plant provided storage and manufacturing space for explosive materials. The conversion of the main plant from tire manufacturing to a small arms ammunition facility was accomplished under contracts awarded by the Corps of Engineers and the U.S. Army Ordnance Department. Construction was supervised by Major C.C. Batson. Offices were set up on 24 April 1942 and work on the main plant began on 2 May 1942. Major construction at the main Cumberland plant, other than utilities and general repairs, was limited to a loading building, four small explosives-storage buildings, and a salvage shed. Renovation work throughout the factory was completed on 29 May 1942.

In order to minimize the danger posed by an ordnance operation at Cumberland, it was decided that all hazardous operations, except loading, were to be performed elsewhere. Consequently, the U.S. government purchased a 425-acre farm located nine miles south of Cumberland in West Virginia. Construction began at the powder farm on 28 May 1942 on buildings for powder storage, chemical storage, primer mixing, primer charging, primer storage and proof testing. In addition, a garage and firehouse also were constructed by the time the facility was completed on 3 February 1943.

The industrial engineering firm of A.J. Brandt Company of St. Louis, Missouri was contracted to make a survey of the plant facility prior to conversion and to design the engineering layout for the machinery

⁵² *Kelly-Springfield Tires, 1894-1944* (Cumberland: Kelly-Springfield Tire Corporation, 1944), 18-20.

⁵³ "History of the Allegany Ordnance Plant From 1942-1943," 1-2.

and equipment to be utilized in the manufacture of the ammunition. The company had just completed similar work at the St. Louis Ordnance Plant. Based on plans and drawings submitted by the A.J. Brandt Company, machinery and required tools were secured for the Cumberland operation. To assist in the procurement process, key personnel from The Kelly Springfield Tire Company's planning, purchasing, engineering, and production departments were transferred to The Kelly Springfield Engineering Company. These personnel assisted in selecting vendors, placing orders, and ensuring that machinery was delivered on schedule.

The original contract between the Allegany Ordnance Plant and the U.S. Government was for the production of .30 caliber ammunition at the daily rate of 1.2 million shells. The first carloads of machinery for the production of such ammunition arrived on 18 June 1942, and each day witnessed continued deliveries and installation. Before all necessary equipment had been received, however, the Ordnance Department modified the contract to the Allegany Ordnance Plant for the manufacture of .50 caliber armor piercing ammunition. The Ordnance Department based its decision on the fact that .50 caliber were in critical demand. Orders for tools, dies, gauges, and other machinery used to manufacture .30 caliber bullets were canceled and all .30 caliber machinery already at the Cumberland plant was shipped to other ordnance plants designated by the U.S. government.

Orders for equipment to manufacture of .50 caliber rounds were immediately placed; the first delivery was received on 25 August 1942. The original deadline for production was 15 September 1942, however, delays in equipment delivery pushed the projected deadline back to 1 October 1942 and it was not until 25 October that the first cartridge was completed. The plant shipped its first railroad carload of ammunition on 30 November 1942.

Since most workers in the Allegany Ordnance Plant were unfamiliar with small-arms ammunition production, a massive pre-production training process took place. Workers were assigned to ordnance plants around the country for four to eight weeks while the Cumberland plant was refitted. Approximately 150 men were assigned to the St. Louis Ordnance Plant in St. Louis, Missouri for training as foremen, supervisors, and adjuster trainees. Another 375 men were placed at the Frankford Arsenal at Philadelphia, Pennsylvania for training as machine adjusters. Upon their return from St. Louis and Philadelphia, these men formed the nucleus of a group that trained new employees.

The Allegany Ordnance Plant received its supply of prime raw materials from a variety of sources. Brass, gilding metal, copper, steel components, and powder were procured through allocation by the Small Arms Ammunition Suboffice. All other raw materials were purchased from sources meeting Army ordnance specifications. The acquisition of tools, gauges, and shipping chests proved some of the most difficult problems in the procurement process. Many vendors agreed to scheduled deliveries, but were unable to deliver tools and gauges as promised. Shipping chests, ordered from local vendors often were found defective. Most vendors in the Cumberland area were not equipped to supply the large quantities of chests needed. Consequently, delays in acquiring the proper tools and gauges, as well as sufficient quantities of shipping chests, further delayed the production of ammunition. Nonetheless, the first railroad car of ammunition was shipped at the end of November 1942. During the first month of production 4,619,520 rounds of .50 caliber ammunition were produced. Production figures steadily increased to 23,351,760 rounds during the last month of production in September 1943.

The number of employees at the Allegany Ordnance Plant exceeded 5,000, approximately 50% of whom were women. Women played a key role not only in the Allegany Ordnance Plant but in the entire war effort. Faced with an unprecedented demand for labor, employers and the U.S. Government alike turned to women. In 1942 the federal government reversed a decade long effort to exclude women from the labor

force, and instead urged women into war production and to pressure employers to hire them. Songs, posters, and newspaper articles appealed to women to take up war work by urging them to "do their share" to "help save lives" to "release able bodied men for fighting."

Millions of women who had never before held jobs outside the home now found employment in shops and factories. More than six million women entered the labor force during the war, increasing the total number of women employed in the U.S. to 19 million. Women performed almost every kind of job, even those previously labeled "men's work." Women tended blast furnaces, ran lathes, operated cranes, greased locomotives, welded hulls, and worked in munitions plants. "Rosie the Riveter" became the familiar symbol of the woman war worker; as a popular song from the period put it, she was "making history working for victory."

Production of .50 caliber shells continued at the Cumberland facility for 11 months. By July 1943, however, stocks of prewar tires were nearly depleted, and tire manufacturing facilities became necessary. Since plants producing synthetic rubber were beginning to appear by this time, the only major problems facing the tire industry were the limited number of manufacturing facilities and the shortage of skilled labor to meet the demand for new synthetic tires. These tires were needed urgently to maintain civilian transportation as well as to supply the huge military orders.

A study conducted by the Ordnance Department indicated that the demand for small-arms ammunition could be met by consolidating and increasing the efficiency of munitions facilities. Therefore, on 26 August 1943 the Kelly-Springfield Engineering Company was notified that their contract for the production of .50 caliber rounds was terminated effective 30 September 1943.

During its 11 months of production the Allegany Ordnance Plant produced millions of rounds of ammunition, completing approximately 30% of its contract. In total, 127,870,560 rounds of .50 caliber armor piercing rounds were produced with the peak daily production of 1,391,000 rounds.

Converting the Cumberland plant into a munitions facility did not end the production of Kelly-Springfield tires. While the Cumberland facility operated as an ordnance plant, Kelly-Springfield continued to build tires in Goodyear plants where surplus space could be found.

Reconversion - Back to Tires

Prior to World War II, the U.S. had been the world's largest importer of crude rubber. However, in the first few months of 1942, Japan captured 90% of the crude rubber in the world and 97% of the American supply.⁵⁴ During World War II, the U.S. faced the challenge of supplying rubber products to its own military, as well as to its allies. To fill military demand and to meet critical civilian needs, the country developed a synthetic rubber industry. In 1941 the government authorized each of the "big four" tire manufacturers -- B.F. Goodrich, Goodyear, Firestone, and U.S. Rubber -- to construct and to operate a synthetic rubber plant. The production of synthetic rubber was extremely successful. At the war's end the U.S. was the world's largest exporter of rubber, all of it synthetic.

⁵⁴ For a full description of the United States synthetic rubber program during World War II see William M. Tuttle Jr. "The Birth of an Industry: The Synthetic Rubber 'Mess' in World War II," *Technology and Culture* 22 (January 1981): 35-67; Robert A. Solo, "The Saga of Synthetic Rubber," *The Bulletin of the Atomic Scientists* 36 (April 1980): 31-36.

The synthetic rubber program had a major impact on the Cumberland operation. By July 1943 the pre-war stockpiles of tires were virtually exhausted. As a result, the U.S. government developed plans to return some tire manufacturing plants that had been converted to manufacturing other supplies for the war effort, back to tire making. The tire industry submitted plans for a \$70 million expansion program to the Office of Rubber Director. The program called for erecting new tire plants, along with the expansion of existing plants. The Cumberland plant was at the top of the list for reconversion.

Kelly-Springfield was a leading candidate for the reconversion program for several reasons. First, Kelly-Springfield had never completely stopped manufacturing tires. Machinery that had been transferred from Cumberland could be returned quickly. Secondly, the company possessed an experienced labor force. Many of the employees who had previously worked in the Cumberland tire plant were currently working in the Allegany Ordnance Plant.

On 27 August 1943 Kelly-Springfield president Edmund S. Burke announced that Kelly-Springfield would convert the Allegany Ordnance Plant back to tire production. Kelly-Springfield used the reconversion period as time to modernize both their plant layout and their equipment. Production techniques in tire manufacturing had changed significantly in the 18 months that the Cumberland plant was out of operation. In addition, problems with the plan of the plant had been recognized by Kelly-Springfield officials for several years, and the reconversion created the opportunity to make changes in layout and material flow patterns, as well as to add modern machinery. By creating an uninterrupted work flow from preparatory operations to tire building, curing, and finishing, the new facility eliminated many of the previous problems of the plant.

The original plant was laid out in one long main building with five wings divided by open courts. The layout was inefficient and the floor plan's complicated traffic and materials flow since production took place on different floors and in five separate wings. To resolve the situation, as well as to create additional space, the open courts were enclosed. The enclosed courts were connected to the wings and main building, thereby creating a continuous main floor for production. The redesigned space was large enough to accommodate all primary operations on one floor, thereby creating an uninterrupted straight-line production system.

The changes to the Cumberland facility were instrumental in keeping Kelly-Springfield competitive with other tire producers. By 1944, total plant payroll was up to 1,700, approximately the same number that the plant employed at its pre-war production peak in 1937.

Postwar Growth - 1950s & 1960s

The 1950s and 1960s was a period of tremendous growth for Kelly-Springfield. With the war over, and Americans confident that their government could handle any problems that arose, people rushed out to get a portion of what was termed "the good life." New homes, stereos, washers and dryers, and new automobiles all became symbols of the middle-class lifestyle. Widespread post-war affluence gave substance to these dreams. By 1953 the average American family enjoyed twice the real income as in the 1920s.

The automobile industry enjoyed tremendous success during this period, profiting from engineering breakthroughs. Spending nearly one-fifth of their budget on research and development, automobile manufacturers utilized the latest technology to increase uniformity of product. In the 1950s alone, 58 million new cars were purchased, and the auto industry kept the public buying by promising glamour and status.

In newer, bigger, and flashier models. The increased number of automobiles led to an enormous demand for tires. Consequently, Kelly-Springfield enjoyed unprecedented profits during the 1950s and 1960s.

Following the war, Kelly-Springfield poured millions of dollars into the expansion and modernization of the Cumberland plant. As the postwar era progressed, the company expanded its sales worldwide, marketing tires in 71 foreign nations. Demand for tires led to the construction of three new plants during the 1960s. On 25 May 1961, Kelly-Springfield announced that Tyler, Texas had been chosen for the location of a new production facility. The first tire at the Tyler plant was produced on 27 April 1962. Since its construction, the Tyler plant has undergone several expansions. The largest was a 1984, \$250 million project to convert the plant from manufacturing bias-ply tires to radial-ply tires.⁵⁵

Kelly-Springfield also built plants at Freeport, Illinois and Fayetteville, North Carolina. Construction at the Freeport site began in 1963. Since that year, the Freeport plant has been expanded 10 times, pushing production to approximately 21,000 tires per day. Construction on the plant at Fayetteville, North Carolina, began in April 1969. Fayetteville is one of the largest tire manufacturing facilities in the world, producing over 50,000 tires daily.⁵⁶

Despite their efforts to build new plants, Kelly-Springfield did not ignore their Cumberland facility. Between the 1960s and the early 1970s, Kelly-Springfield invested millions of dollars to improve the Cumberland plant. One of the largest expansions occurred in 1963 when Kelly-Springfield invested over \$10 million to renovate the plant. New curing equipment, post-cure inflation equipment, and additional recording equipment for quality control were added to the Cumberland plant. In addition, storage for raw materials and finished goods, increased green tire storage facilities, an addition to the cement house, additional new passenger tire building equipment, and an expanded and revised final finish department were part of the expansion. The most visible evidence of Kelly-Springfield's extensive expansion program was the construction of an executive office building located adjacent to the original laboratory building.⁵⁷

In addition to building new production facilities and expanding old ones, Kelly-Springfield expanded its operations by purchasing other tire manufacturing companies. In 1962, Kelly-Springfield bought four corporations – the Hicks Rubber Company, Star Rubber Company, Richmond Rubber Company, and Richmond Tire & Rubber Company. All four companies were operated as Kelly-Springfield subsidiaries until 1964, when they merged and became the Star Rubber Company.⁵⁸

Kelly-Springfield's growth in the 25 years after the end of World War II was tremendous. Expanding existing facilities, building new plants, and purchasing other rubber companies characterized the company during this period. Despite their best efforts to modernize the Cumberland facility and to operate a cost-

⁵⁵ Jackson, *The Kelly-Springfield Story*, 133-137. The distinction between a bias ply and radial tire is the direction in which the cords are laid in the carcass of the tire. In a bias-ply tire, the cords are laid at an angle of approximately 55 degrees to the wheel axle; in a radial-ply tire, the cords run parallel to the axle. Radial-ply tires, although more expensive, were found to be more durable and to achieve better gas mileage.

⁵⁶ Jackson, *The Kelly-Springfield Story*, 139-169.

⁵⁷ "Kelly's Expansion Program Extended," *Cumberland Evening News*, July 1963.

⁵⁸ Jackson, *The Kelly-Springfield Story*, 183.

effective and competitive plant. It was becoming clear to Kelly-Springfield management by the mid-1970s that the Cumberland facility might have to be shut down.

Cumberland Plant Closes

During the 1970s and 1980s, the Cumberland plant faced a series of problems, including changes in consumer preferences for types of tires, labor relations, and the general slowdown of the economy in the early part of the decade. Furthermore, by the mid-1980s the Cumberland plant, with its aging buildings, equipment, methods, and interior design, was becoming more costly to operate. Ultimately, these factors forced the plant to close.

During the last 20 years of the Cumberland operation, many efforts were made to extend the life of the plant. By 1970, Kelly-Springfield was not only manufacturing its own brand name tires but it also manufactured tires for discount stores, department stores, and automotive and farm equipment supply firms. By the mid-1970s the Cumberland plant employed over 3,000 people.

Kelly-Springfield was affected by the recession of the mid-1970s. Skyrocketing inflation was reflected in the prices for raw materials. In addition, in 1970 Kelly-Springfield was forced to convert two coal-burning boilers to fuel oil boilers to meet new state and federal government clean air standards. With the energy crisis created by the International oil embargo, the price for fuel oil climbed from nine cents per gallon to over 30 cents per gallon. Faced with every increasing costs from waste, absenteeism, and labor, Kelly-Springfield searched for ways to reduce their operating costs.⁵⁹

The first step was to return to coal-fired boilers, which company officials projected would produce significant savings and make the plant more competitive. Through a concerted effort of company, state, federal, and local officials, a drive began to permit the company to burn coal once again. In October 1975, Maryland Governor Marvin Mandel signed an order granting the company a variance enabling it to use locally-mined coal. Ultimately, through the efforts of retired U.S. Senator J. Glenn Beall Jr. the Environmental Protection Agency agreed to the changeover. The \$2.6 million dollar reconversion project breathed a breath of new life into the Cumberland plant. The lower fuel costs, estimated at over two million dollars per year, helped to reduce plant operating costs, thereby making the facility more competitive with other plants.⁶⁰

Efforts also were made to reduce operating costs at the Cumberland facility through negotiations with the United Rubber Workers Local 26. In 1984 union leaders worked with company officials to make the plant more cost competitive. The new contract was signed on 19 February 1984 and, among the many concessions made by workers, it included a switch from piece work rates to a top-turn rate system with a freeze on the cost-of-living allowance. The new contract helped extend the life of the Cumberland facility another three years. Clifford H. Johnson became president of Kelly-Springfield in 1985 and in early 1986 a meeting between Johnson and Goodyear Chairman Mercer offered guarded hope for the future of the Cumberland facility. At the meeting it was decided to keep the facility open as long as the bias tire market remained profitable. Production continued at the plant for another year, but in 1987 events outside of the control of Kelly-Springfield forced the closure of the 66-year old plant.

⁵⁹ For more detailed information on the changeover from coal to fuel oil and back to coal see *Kelly-Springfield: Back to Coal*, 30 June 1977.

⁶⁰ *Back to Coal*, 30 June 1977.

The two primary reasons for the closure of the Cumberland facility were the attempted takeover of Kelly-Springfield's parent company, Goodyear, by Sir James Goldsmith of England and the collapse of the bias ply tire market. In 1987 it was estimated that bias and bias belted tires, which accounted for 66% of the tire market in 1977, would have only 12% of the market and by 1991 it would decline to 3%.⁶¹ The same problem confronted bias medium truck tires. It was estimated that in 1987 bias medium truck tires would have only 42% of the market, and this number would fall to 26% by 1991. According to figures released from Kelly-Springfield in 1977, bias medium truck tires accounted for 68% of the market. Hastening the decline of the bias products was the availability of low priced radial auto and medium truck tires being imported and sold in the U.S.

The other key issue contributing to the closing of the Cumberland plant was the attempted takeover of Goodyear by Sir James Goldsmith in November 1986. Although successful in stopping Goldsmith's attempted takeover, Goodyear incurred a debt of \$5.3 billion to repurchase Goldsmith's holdings and to acquire other stock. The attempted takeover of Goodyear concerned Kelly-Springfield employees in Cumberland because it forced the parent company into a restructuring plan. United Rubber Workers Local 26 President Clayton C. Oster responded to the question of what the attempted takeover meant to Kelly-Springfield in Cumberland by responding "I don't know what it means. I don't know if anyone does." He continued "I'm cautiously concerned about where we fit into the picture."⁶²

On 22 November 1986 workers at the Cumberland plant awoke to the news that "the Kelly-Springfield Tire Company will permanently end production at Cumberland within six months, and the company's corporate headquarters will be transferred elsewhere within the Goodyear Tire & Rubber Company system."⁶³ Kelly-Springfield Chief Executive Officer Clifford H. Johnson said Goodyear Chairman Robert E. Mercer announced the shutdown after Goodyear agreed to spend \$2.7 billion to purchase common stock to stop the unwanted takeover by foreign investor Sir James Goldsmith. Such a staggering debt forced Goodyear to close its older and less profitable manufacturing facilities, including Cumberland. At the time of the closing announcement, 1,675 hourly and salaried employees were employed at the Cumberland facility and the plant was producing approximately 11,000 tires daily.⁶⁴

Chief Executive Officer Clifford Johnson compared the shock of the unexpected closing announcement to a sonic boom: "At first you don't even know what it is then it hits."⁶⁵ One employee characterized the closing as akin "to losing a friend."⁶⁶ Local and state officials were quick to offer assistance in terms of employment training and social services. In addition, Maryland's congressional delegation said they would work to shuttle additional federal dollars into the area.

⁶¹ "Cumberland Plant's 66-Year Career Ends," 1.

⁶² "Kelly-Springfield Awaits Goodyear Restructuring Details," *Cumberland Times-News*, 21 November 1986.

⁶³ "Kelly-Springfield Shutting Down," *Cumberland News*, 22 November 1986.

⁶⁴ "Kelly-Springfield Shutting Down," *Cumberland News*, 22 November 1986.

⁶⁵ "Kelly-Springfield Shutting Down," *Cumberland News*, 22 November 1986.

⁶⁶ "End of an Era: Last Tire Rolls Off Line," *Cumberland News*, 21 May 1987.

In the last full year of operation the Cumberland plant contributed more than \$69 million to the area economy, with the largest segment of the money, \$53.5 million, in the form of salaries and wages paid to employees.⁸⁷ Approximately \$401,700 in state taxes and about \$1.1 million in local taxes were also paid by Kelly-Springfield. In addition, Kelly-Springfield made approximately \$11.26 million in local purchases from 500 different companies and made an additional \$1.7 million in freight payments. The last tire to be manufactured at the Cumberland plant was a G 60-14, which came off the curing press on 14 May 1987. From 1934 until 1987 the Cumberland plant manufactured approximately 170 million tires. After closing the Cumberland plant, Kelly-Springfield increased production at its plants in Tyler, Freeport, and Fayetteville.

After the attempted takeover and the closing of the Cumberland plant, the company announced it would also relocate its corporate headquarters from Cumberland to Dallas, Texas. Kelly-Springfield Chief Executive Officer Clifford Johnson said without the plant, Cumberland is "not a good location for a corporate headquarters from a travel standpoint." He said Kelly-Springfield salesmen and executives must travel at least three hours, each way, to Baltimore-Washington International or any other airport. "The center of our operation is south of St. Louis and west of the Mississippi so we are far east of the center of operation."⁸⁸

In a last ditch attempt to retain the Kelly-Springfield headquarters in Cumberland, Governor William Schaefer, backed by the Maryland legislature, promised to build a 132,000-square foot office building with a 35,000-square foot tire testing laboratory at an estimated cost of \$15.1 million. Construction of the facility would be handled by the Maryland Economic Development Corporation and the facilities would be leased to Kelly-Springfield for 20 years with three five-year options. At the conclusion of the lease, Kelly-Springfield will repay \$25 million and the state maintains ownership of the complex. The state's proposition was accepted and the agreement was signed in March 1987. Ground was broken for the new facility on 2 March 1987; the official opening was held on 12 November 1987. By 1988, Kelly-Springfield employed approximately 625 people in its Cumberland headquarters.

During its 75-year relationship with Cumberland, Kelly-Springfield has played a key role in the economy and social history of the area. Hundreds of millions of dollars have been put into the economy through wages and charitable donations, and thousands of employees have been given employment opportunities. Although Kelly-Springfield closed its production facility in 1987, the company has remained a vital component of the Cumberland community and continues to provide economic and social benefits to the area by maintaining their corporate headquarters and primary testing facilities in Cumberland.

Industrial Processes

Introduction

The industrial history of the Kelly-Springfield plant can be divided into these major periods, which reflect the chronological development of the facility. These periods, Early Tire Manufacturing (1921 - 1942); Ammunition Manufacturing (1942 - 1945); and Return to Tire Manufacturing (1943 - 1987), are defined by both product and process. While minimal evidence of the machines associated with these manufacturing processes survives, the physical development of the plant, supplemented by historical records suggest how

⁸⁷ "Cumberland Plant's 66-Year Career Ends," 3.

⁸⁸ "Kelly-Springfield Shutting Down," *The Cumberland Times*, 22 November 1986.

the complex was used to accommodate the different industrial processes. Records of the industrial process were more readily available for the latest period of development than for the earlier periods.

Early Tire Manufacturing in Cumberland (1921 - 1942)

Pre-World War II tires consisted of five main parts: (1) an inner tube to hold compressed air; (2) a carcass which consisted of rubberized fabric that protected the inner tube and held it in place; (3) a wire bead which held the tire on the rim; (4) a sidewall that held the tread and the carcass together; and, (5) a tread that served to protect the tire from abrasions and to provide traction. Manufacture and assembly of the five major tire components defined the early tire building process at Cumberland. The fabrication of each element of the tire constituted a different stage of the sequential production process. The following discussion presents an overview of the tire manufacturing process at Kelly-Springfield prior to World War II. Although all buildings within the complex played a role in the tire manufacturing process, all tasks relating directly to tire manufacturing occurred within the main factory building. In keeping with early twentieth century industrial design, the factory was designed as a multi-story building with wings. Components were produced at all floor levels and shuttled between the floors. The wing configuration allowed maximum light and air into the work spaces. The major tasks that took place in the factory building are discussed separately.

Mixing of the Rubber. The first step in the process was the mixing of the rubber. Natural rubber was delivered by rail to the loading dock at the east side of Wing 1. Each bale of rubber weighed approximately 250 lbs. The crude rubber was placed into mills located in Wings 1 and 2 of the main factory building. These mills consisted of large, horizontal steel rollers that turned in different directions and at different speeds to knead the rubber until it was soft and pliable. During this masticating process, the rubber was mixed with a variety of compounds. Compounds included accelerators, softeners, and reinforcing agents. Different rubber mixtures (stocks) were specified for the various components of the tire. Following mixing, the rubber was milled into sheets, dried, and conveyed to the different areas of the plants.

Fabric Treatment. Cotton fabric (cord) was utilized to produce rubberized fabrics used in building the tire carcass. The cotton cord was shipped to the factory and carefully inspected before used. On the main floor (Floor B) of the Header Building, the cotton cords were fed through giant calenders. Calenders consist of a series of horizontal rollers. As the fabric is fed through the rollers, the fabric becomes completely coated with hot, soft, compounded rubber. Rubber was applied to the fabric one side at a time. Following calendering, the cords were cut on a bias into strips appropriately sized for the tire being produced.

Tread, Sidewall, and Inner Tube. While calendering was in process, the tread, sidewall, and inner tube were manufactured. The sidewalls, treads, and inner tubes were created by feeding compounded rubber through an extruding machine. The same extruding machine was used for these different components; a removable die determined the shape, thickness, and width of the finished product. In addition to specific dies, the manufacture of each component required different rubber compounds. Following extrusion (a process that generates heat), the stock was cooled with water.⁶⁹ Water was delivered to the plant from a holding reservoir next to the Machine Shop (Building 18). Bead Assembly. Another process occurring simultaneous to the tread, tube, and sidewall production was the assembly of

⁶⁹ Allen, *The House of Goodyear*, 138; Bahr, *Collier's Encyclopedia*, vol. 20 (New York: P.F. Collier, 1994).

the beads. Beads were produced by encasing multiple strands of thin wire in rubber. The rubber stock used in the bead had to be hard but flexible, and it had to retain its flexibility throughout the life of the tire.

Tire Building. All of the individual components came together during the next step in the tire manufacturing process – tire building. This step was undertaken on collapsible drums. The carcass was formed by laying plies of rubberized fabric on the drum. The beads were then laid in place and carefully tied in by the overlapping plies. Then, the sidewall and treads were applied over the rubberized fabric. Rubber cement, mixed in the cement house, was used to apply the tread. When all parts were in place, the drum was collapsed and the tire removed. At this point, the tire looked like a barrel with both ends open. This step resulted in the construction of a flat built tire.

Tire Vulcanization (Curing). All rubber products are vulcanized (cured). For tires, vulcanization is the process that bonds the different parts of a tire into one integral unit. Vulcanization also molded the tread design.⁷⁰ During the earliest period of tire-building at the Cumberland plant, the vulcanizing process took place in Court 4.

To initiate the vulcanization process, the flat tire was sent to a machine where an airbag was inserted. Here, the tire was inflated to its final shape with compressed air. Following this airbag step, the "green tire" was vulcanized in heaters. With pot heaters, the green tires were laid in molds, stacked on top of each other, and lowered to the bottom of the vulcanizer extending below the floor level. To vulcanize the tires, steam surrounded the molds, and steam and air were supplied to the inside of the airbags. The curing time in a pot heater ranged from 40 minutes for a passenger tire to 150 minutes for a truck tire.⁷¹

After curing in a pot heater, the tire was placed on a hook conveyor and moved to a dewatering trough where the condensation collected in the airbag during curing was removed. Following this process, the airbag was cooled and sent back to be reused. The cured tire proceeded via hook conveyor to the final finish department.⁷²

Tire Inspection. Following the curing process, a tire was sent to the "Final Finish" department. Here, tires underwent final finishing operations and inspection. First, the rubber vents were manually removed. During the curing process, small vents allowed the steam to escape. These vents resulted in small whisker-like protrusions on the tires. Following cosmetic adjustments to the tires, the tires were carefully inspected. Tires that passed inspection proceeded to the warehouse and shipping area.

Changes to the Tire Manufacturing Process. Due to continuous changes in the design and development of tires, the tire manufacturing process changed constantly. For example, between World War I and World War II, truck tires shifted from predominantly solid tires to predominantly pneumatic tires.

Materials also changed. New compounds were developed to add to rubber mixtures to prevent aging, and to achieve different levels of durability. During the 1930s, rayon cord was introduced as a more

⁷⁰ McGraw-Hill Encyclopedia of Science and Technology (New York: McGraw-Hill Inc., 1992), 388-9.

⁷¹ Reed, "The Story of a Tire and Inner Tube," June 1960, 17-19.

⁷² Reed, "The Story of a Tire and Inner Tube," 17-19.

durable alternative to cotton cord. Rayon had greater resistance to heat than cotton, and therefore would not break down as quickly.⁷³

New equipment also was introduced. Among the most significant developments in machinery was the Banbury mixer, which was developed during the 1920s. The Banbury is an enclosed mixer with two rotors revolving in opposite directions and at different speeds in a water-cooled chamber. The rubber and the other compounding ingredients are fed into the Banbury through a hopper at the top. Because the Banbury greatly reduced the time needed to soften the rubber and to blend the compounding ingredients, it eventually replaced the old mixing mills.

Within the factory, these developments required continuously changing equipment layouts and processes. In 1934, the original layout of the plant began to be criticized. The multi-story and multi-wing configuration was considered ineffective and was thought to hinder efficient production.⁷⁴

Ammunition Manufacturing (1943 - 1945)

The Kelly-Springfield plant was selected a plant for the production of munitions for several reasons. First, the plant was arranged in functional areas as were other Army ordnance installations. The Cumberland facility provided areas for administration, production, storage, repairs, and utilities. Second, the plant incorporated numerous safety features to protect employees. Built-in safety features included the masonry fire walls to separate explosive portions of the manufacturing process. Third, the plant could provide its own power and water, and fourth, the plant incorporated a vast network of railways for receiving and shipping materials.⁷⁵

When Kelly-Springfield was awarded the contract to produce ammunition in January 1942, plans immediately got underway for the conversion of the plant from tire manufacturing to ammunition production. The industrial engineering firm, A.J. Brandt Company, of St. Louis, Missouri was hired to survey the existing plant facilities, to estimate the equipment necessary for small arms production, and to design the layout for the machinery. The Brandt Company had been involved in similar work at the St. Louis Ordnance Plant. Mr. J.H. Stevens, consulting engineer for the firm, first visited the plant on March 6, 1942.⁷⁶

The Allegany Ordnance Plant, as the Kelly-Springfield plant was known during the war years, consisted of the main plant in Cumberland and a 425-acre farm in Mineral County, West Virginia, approximately nine miles southwest of Cumberland. All the hazardous operations, such as powder storage, shell loading, and testing, were performed at the more remote West Virginia facility.

The first step in converting the Cumberland plant was the removal of most of the tire manufacturing machinery from the areas of the plant leased to the government for the ammunition manufacturing. This

⁷³ Allen, *The House of Goodyear*, 155.

⁷⁴ Jackson, *Kelly-Springfield Story*, 103-4.

⁷⁵ Deborah Cannan et al, *Historic Context for the Army Materiel Command's World War II Facilities*, 100.

⁷⁶ "History of the Allegany Ordnance Plant," 4; Jackson, *Kelly-Springfield Story*, 114.

work was undertaken between March and May 1942. All machinery and rubber stock were transferred to predetermined storage locations.⁷⁷ The plant originally was scheduled to produce .30 caliber ammunition; however, in July 1942, the Ordnance Department modified the Kelly-Springfield contract to the production of .50 caliber ammunition.⁷⁸

Over 800 specialized machines were installed in the Cumberland plant for the manufacturing of munitions. Machinery acquired included production line equipment as well as the associated tool room equipment necessary for maintenance and repair.⁷⁹

With the exception of equipment changes, few major alterations were made to the buildings at the Cumberland plant. New construction at the plant during the war was limited to a loading building, four small explosives buildings, and a salvage shed.⁸⁰ In addition, four watch towers were constructed along the perimeter of the site. The design and construction of the new buildings was supervised by Army Corps of Engineers Major C. C. Batson.⁸¹ Most of the new structures were located south of the main factory building. None of these buildings survives. A site plan from 1943 illustrates the layout of the Cumberland facility during the operation of the Allegany Ordnance Plant.

The production crew for manufacturing ammunition consisted mainly of the Kelly-Springfield work force. Since ammunition manufacturing was an entirely new area to them, extensive training was necessary. Training was initiated in September 1942 and lasted for nearly a month.⁸² Ammunition production began in October, and the first carload of .50 caliber ammunition was shipped from the plant on 30 November 1942.⁸³

Security at the plant was increased while the plant was involved in munitions production. Security included Military Police stationed at watch towers and the main gate, and mounted guards to patrol the grounds.⁸⁴ In addition, each plant employee was issued an identification badge that permitted entry into specified areas of the plant.

The Allegany Ordnance Plant was involved in the manufacturing of both .50 caliber ammunition and eight-inch high explosive shells. The production methods implemented at the Allegany Ordnance Plant were

⁷⁷ "History of the Allegany Ordnance Plant," 4.

⁷⁸ "GOCO Facilities Directory" MS (microfiche), AMCCOM Historical Office, Rock Island Arsenal, Illinois, 49.

⁷⁹ Schleif, "Kelly-Springfield Tire Company's History of Ordnance Production," 1943, 3.

⁸⁰ Jackson, *Kelly-Springfield Story*, 116.

⁸¹ "History of the Allegany Ordnance Plant," 3.

⁸² Schleif, "Kelly-Springfield Tire Company's History of Ordnance Production," 7.

⁸³ GOCO Facilities Directory, 48.

⁸⁴ "From Armorubber to Armor-Piercing Bullets," 16-17.

similar to those plants in other areas of the country that already were actively producing small arms ammunition. These processes are discussed below.

Manufacturing .50 Caliber Ammunition. There are four components of a cartridge: cartridge case, projectile, primer, and powder. The production process began with shaping the case and projectile, which were both metal components. Then the propellant and primer were added before crimping the assembly together. Although the process was relatively simple in theory, the requirements for exact precision and the demand for billions of rounds complicated the production process.

Manufacture of the cartridge case began with a small brass cup. The brass was shaped into a cartridge case through a series of "draws," and other shaping operations. During the shaping process, the brass was annealed, or heat treated, to remove the metal stresses caused by the reshaping. Between each annealing operation, the brass was pickled, or treated in acid, to remove oxides created by the heat, and washed to remove the acid.⁸⁵

The procedures for fabricating the projectile was similar to the process for shaping the cartridge case. Each projectile had a metal jacket that was shaped through a series of operations. Again, the process required meticulous attention to exacting measurements. A steel core then was inserted into the jacket.⁸⁶

Smokeless powder was added to complete the round. The primer was a sensitive explosive designed to initiate the explosion when struck by a firing pin. Primer was added to the base of the cartridge case and waterproofed with a varnish. A small quantity of smokeless powder was poured into the cartridge case. Finally, the projectile was crimped to the cartridge case.⁸⁷

As in the case with all ammunition production, quality control was a major consideration. To avoid malfunctioning weapons, the Ordnance Department imposed exact specifications for external dimensions, weight, etc., which were verified by repeated inspections during the production process. After delivery of a lot to the government, an ordnance inspector selected a few rounds from the lot for inspection. The final examination included test firing or disassembly of a few rounds from each lot. Failure of a round to meet the specifications could result in the rejection of the entire lot. To prevent rejection, inspectors were stationed at critical locations to examine parts as they moved through the production process.⁸⁸

Raw materials entered from the railroad siding at the east side of Wing 1. These materials consisted of metal cups from which the outer casing of the cartridge and the bullet jacket are formed, hard steel cores, and soft lead lubricating tips. Electric trucks were used to carry these materials to the various machines.⁸⁹

⁸⁵ Herb, "Small Arms Ammunition," 2-17.

⁸⁶ Herb, "Small Arms Ammunition," 18-21.

⁸⁷ Herb, "Small Arms Ammunition," 21-24.

⁸⁸ Thomson and Mayo, *Procurement and Supply*, 206-8.

⁸⁹ "From Armorubber to Armor-Piercing Bullets," 8.

Like tires, the raw materials first went through preparatory operations, then proceeded to assembly, finishing operations, inspection, packaging, and finally, shipment. Having proceeded through the different wings, munitions were shipped by rail from the west side of Wing 5.⁹⁰

Manufacturing a High-Explosive Shell. The Kelly-Springfield was responsible for producing an 8" shell for high explosives. The materials used for the shells was a heavy metal. The manufacturing process involved nosing the metal, which consisted of heating and molding the metal to the specified shape. After the heat-treating was completed, the shell was machined down to its proper dimension and weight. The finished shells were transferred to other plants where they were loaded with high explosives and fuses.

Return to Tire Manufacturing at the Cumberland Plant (1943 - 1987)

The reconversion of the plant back to tire manufacturing began in September 1943, when all munitions manufacturing equipment was removed.⁹¹ This conversion provided Kelly-Springfield with the opportunity to assess its previous manufacturing strategies and to develop an appropriate and efficient plan for future tire production.

Due to the advances in tire manufacturing made during the war, tire production techniques were changed. Synthetic rubber was beginning to be used more frequently and new machinery was being developed. To accommodate new materials and new manufacturing techniques, the Cumberland factory was remodeled. Changes included the overall layout of operations and flow patterns of materials. Originally, the main factory building was designed with five wings separated by open courts. This proved to be inefficient because the separate wings interrupted the flow of the manufacturing process. During the plant reconversion in 1943, the decision was made to infill the open courts to increase the floor space on the main floor (Floor B). Monitor roofs were placed over the courts, and concrete floors were poured. With these changes, the factory could nearly accommodate a straight-line production process, which had proved so effective in automobile manufacturing plants. The new Cumberland layout was designed to operate primarily on a single level so that production could advance smoothly from one production area to the next without interruption.⁹² Space on the upper floors of the factory was used for final finish work, materials storage, and administrative offices.

Through the 1950s and 1960s, the company continued to expand its operations and further altered the physical layout of the complex. Additions were constructed along both the north and south elevations of the factory building. Along the wings and courts, buildings were added to provide additional tire building areas. Construction south of the factory building during this period consisted mainly of sorting, storage, and distribution areas. Loading bays for trucks were located along the south elevation of these new warehouses.

Despite the numerous changes in layout and equipment, the process and order of tire manufacturing did not change dramatically between the pre-World War II and post-World War II periods. As in the earlier overview of tire manufacturing at the plant, the following discussion is organized according to major tasks in the manufacturing process.

⁹⁰ "From Armorubber to Armor-Piercing Bullets," 6.

⁹¹ Jackson, *Kelly-Springfield Story*, 122.

⁹² Cannan et al, *Historic Context for the Army Materiel Command's World War II Facilities*.

Mixing of Rubber. Mixing rubber remained the initial step in the tire manufacturing process. New high-speed Banbury mixers were introduced into the factory after the war, as were pelletizers. The pelletizer represented a new method of conveying rubber within the plant. Once the rubber stock was mixed in the Banbury, the rubber was directed to the pelletizer. Unlike a mill, which produced conventional sheets of rubber, the new pelletizer converted rubber stock to pellets, which could be moved by air through a special network of pipes.

Fabric Treatment. New fabrics were used more commonly. Rayon and nylon replaced cotton. Rayon tires were introduced during the 1930s; nylon tires were introduced during the mid-1940s. These improvements made it possible to construct stronger tires using fewer plies. The new fabrics, however, required different preparation, conditioning, and testing treatments.

Fabrics first were dipped in a solution to make the fabric airtight. Following the dipping, the fabric was fed through squeeze rollers to remove excess solution, then through a drying tower, and finally through a series of heat-treating ovens. The fabric traveled approximately one-third of a mile through this entire course of processing. Before calendaring, the fabric was stored in conditioning rooms at controlled temperature and humidity levels. Conditioning improved adhesion and minimized moisture. As fabrics were needed, they were removed from the conditioning room and placed through the calendaring process where rubber would be applied to the fabric surface.⁹³

As they did prior to World War II, fabrics proceeded to the bias cutting machines following the calendaring operation. Fabrics were cut on a bias to specified widths. From there, the cut fabrics were delivered to the tire building areas.

Tread, Sidewall, and Inner Tube. The process for the production of the treads and sidewalls also did not change significantly from the pre-World War II period. Specified rubber stocks were extruded through a machine, and then water-cooled. One of the changes in the process was the installation of the cooling tower (Building 71), which provided the cooled water used in the tread and sidewall building process.

By 1950, most inner tubes were manufactured from synthetic rubber, which was considered superior to natural rubber except in particularly cold climates. The production process remained the same; the inner tube was extruded on a machine.

The tubeless tire grew increasingly popular during the early 1950s. By 1955, tubeless tires were used on all new cars. A tubeless tire was made with a sheet of laminated rubber applied to the inner side of the first ply of fabric which, when cured, served as an air sealant, replacing the inner tube.⁹⁴

Bead Assembly. Like tread production, bead assembly underwent minimal changes between the pre-World War II and post-World War II period. The beads continued to be manufactured on a standard extruding machine.

Tire Building. During the 1950s, the tire building process was carried out on a semi-automatic machine. By the 1960s, the tire building machines at the factory were changed. The old tire drums were

⁹³ Reed, "The Story of a Tire and Inner Tube," 11-12.

⁹⁴ Reed, "The Story of a Tire and Inner Tube," 21-22.

steel, while the new drums were rubber and more technically sophisticated. The general process of building the tire remained the same, but the new machines automated the process, thereby standardizing and speeding up manufacturing. The machines incorporated rollers that were put against the drum and rolled towards the ends, forcing out air and ensuring that no air was trapped between the plies. Bead setters, another device on the machine, applied the bead to the tire during the building process. Following the addition of the tread and sidewalls, the expandable drum was collapsed and the tire was removed. From there, the tire moved onto the curing process.

Tire Vulcanization (Curing). Tire curing process is one of the processes in tire manufacturing that continually changed over the years. Changes in the post-World War II period were due mainly to the introduction of more efficient equipment.

During the 1950s, prior to curing, the flat tire underwent several preparatory operations. First, a spray lubrication was applied to the tire. Second, the tire was shaped by inserting and inflating an airbag. Once the tire received its shape resembling a finished tire, it was ready to be cured.⁹⁵

Two primary types of vulcanizers were used during the 1950s: pot heaters and conventional tire presses. Both required the use of an airbag. Pot heaters were discussed in the earlier section. With the conventional tire press, the bottom half of the press contained half of the mold and the lid of the press contained the other half of the mold. The tire was laid in the bottom half of the mold, the airbag was connected to the air-steam line, and the press was electrically closed, locked, and automatically controlled by timer. When curing was completed, the tire press opened automatically. In contrast to the pot heaters which required 40 minutes of curing time for a passenger tire and 150 minutes for a truck tire, these early tire presses reduced the time to 30 minutes for a passenger tire and 103 minutes for a truck tire.

After curing in either a pot heater or conventional tire press, the tire was placed on a hook conveyor and moved to a dewatering trough where the condensation collected in the airbag during curing was removed. Then, a bag extracting machine automatically removed the airbag from the tire. The airbag was then cooled and reused. The cured tire proceeded via hook conveyor to the final finish department.⁹⁶

By 1960, the curing process was again improved. Bagomatic (bladder) presses were introduced. These new presses eliminated the airbag insertion step. That is, a bladder in the center of the tire press acted as the airbag. When press was opened, the green tire was placed over the bladder. As press closed, the air and steam inside the bladder inflated and shaped the green tire to the mold. Using these presses, curing time was shortened significantly; a passenger tire was cured in 16 to 18 minutes.⁹⁷

Tire Inspection. During final finish, tires were subjected to numerous operations. First, the rubber vents left from the curing process were manually removed. Tires then were carefully inspected under powerful lights. Tires that passed this inspection proceeded by conveyor to a tread gauging area where a

⁹⁵ Reed, "The Story of a Tire and Inner Tube," 17-19.

⁹⁶ Reed, "The Story of a Tire and Inner Tube," 17-19.

⁹⁷ Reed, "The Story of a Tire and Inner Tube," 17-19.

sample of the tires were tested for tire tread uniformity. Tires were then balanced on a balancing machine. A belt conveyor carried the inspected tires to the warehouse where they were sorted prior to shipment.⁹⁸

⁹⁸ Reed, "The Story of a Tire and Inner Tube," 19-20.

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View southeast of Kelly-Springfield Tire Plant. Ca. 1970.

View south of wings and courts. Ca. 1950.

View southeast of Wings 1 and 2. Ca. 1950.

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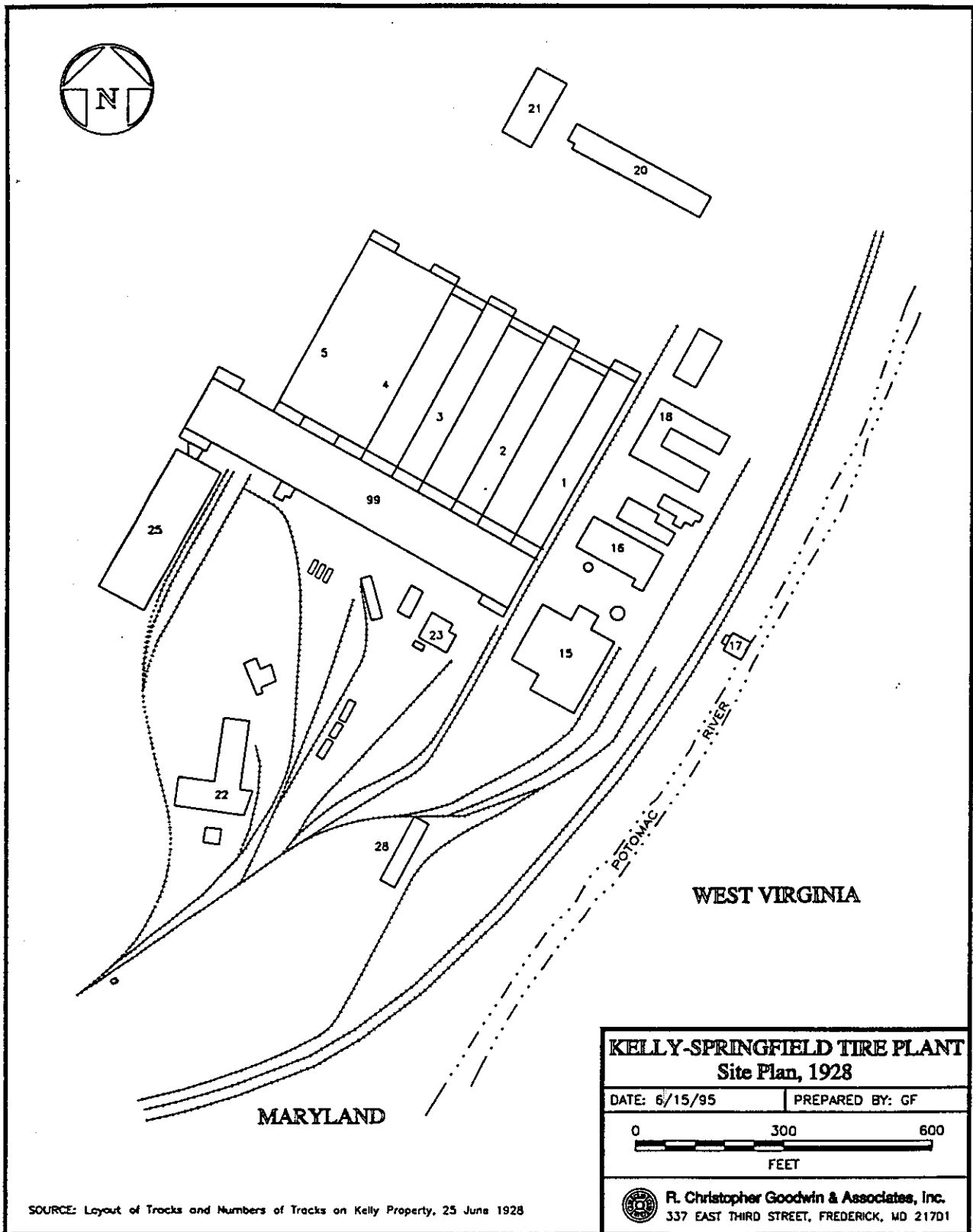
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KEY TO BUILDINGS, KELLY-SPRINGFIELD TIRE PLANT SITE PLAN, 1928

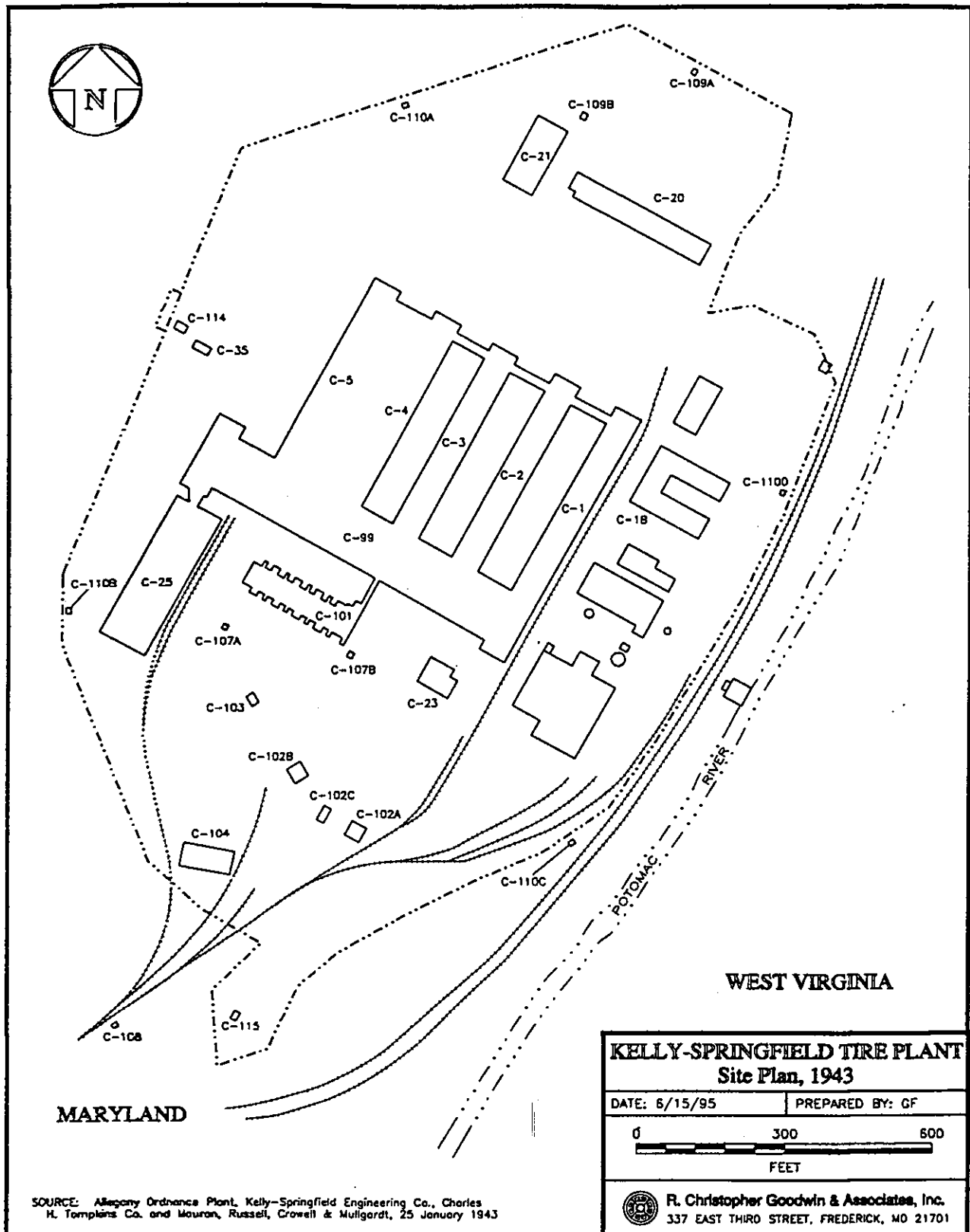
Building No.	Building Name/Use
1	Factory Building, Wing 1
2	Factory Building, Wing 2
3	Factory Building, Wing 3
4	Factory Building, Wing 4
5	Factory Building, Wing 5
15	Power House
16	Pump House
17	Intake Building
18	Mechanical Building
20	Laboratory
21	Garage
22	Not Identified
23	Cement House
25	Warehouse
28	Not Available



KEY TO BUILDINGS, KELLY-SPRINGFIELD TIRE PLANT SITE PLAN, 1943

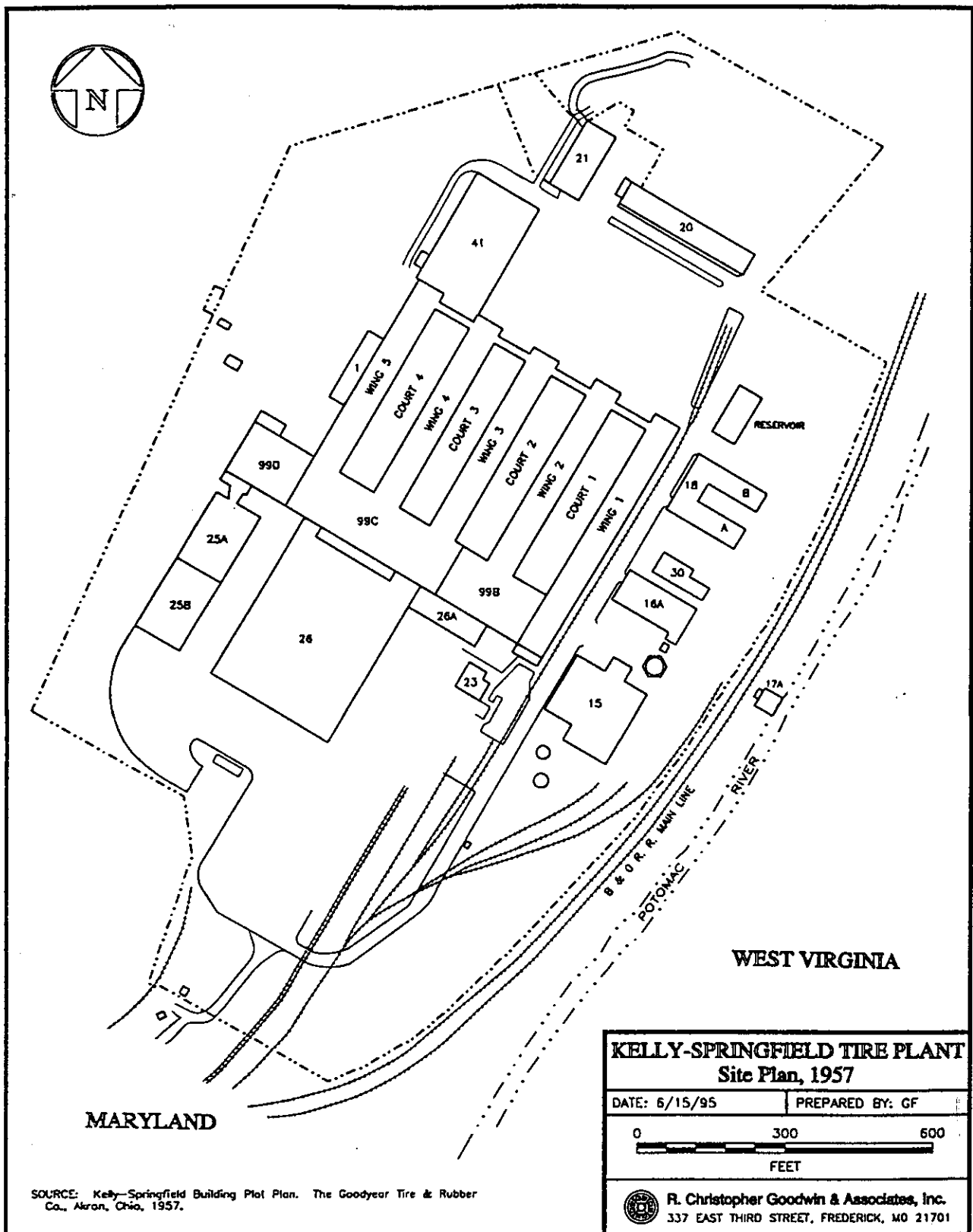
Building No.	Building Name/Use
C-1	Tool Storage -- Floor C Tool and Gauge Dept. -- Floor D
C-2	Main Cafeteria and Kitchen -- Floor B Ordnance Offices -- Floor D
C-3	Lead Shop and Primer Cup & Anvil -- Floor A Bullet Manufacturing and Assembly -- Floor B Bullet Manufacturing and Assembly -- Floor C Kelly-Springfield Engineering Co. Offices -- Floor D
C-4	Main Toilet and Locker Rooms -- Floor A Case Manufacturing -- Floor B Case Manufacturing -- Floor C
C-5	Case Manufacturing -- Floor B Case Manufacturing -- Floor C Gauge and Weigh Department -- Floor D
C-18	Mechanical Building
C-20	Personnel Building
C-21	Garage
C-23	Bullet Salvage and Oil Storage
C-25	Shipping Building and Platform
C-35	Gas Meter House
C-99	Hospital -- Floor B Colored Help's Toilet Rooms, Locker Room, and Cafeteria -- Floor B Primer Insert Department, Floor B Shipping Department, Floor B Raw Material Storage Room, Floor B Central Store Room, Floor B Tool Storage, Floor C Carton Manufacturing, Floor C Case Gage Department, Floor D Government Inspection, Floor D Labeling and Packing Department, Floor D Blank, Cup, and Core Wash Department, Floor B
C-101	Loading Building
C-102A	Powder Magazine

Building No.	Building Name/Use
C-102B	Powder Magazine
C-102C	Can Storage Building
C-103	Primer Magazine
C-104	Salvage Building
C-107A	Fire Equipment Building
C-107B	Fire Equipment Building
C-108	Track Scale and Guard House
C-109A	Gate House
C-109B	Gate House
C-110A	Guard Tower
C-110B	Guard Tower
C-110C	Guard Tower
C-110D	Guard Tower
C-114	Chlorinator Building
C-115	Incinerator



KEY TO BUILDINGS, KELLY-SPRINGFIELD TIRE PLANT SITE PLAN, 1957

Building No.	Building Name/Use
Wing 1	Factory Building, Wing 1
Court 1	Factory Building, Court 1
Wing 1	Factory Building, Wing 2
Court 2	Factory Building, Court 2
Wing 3	Factory Building, Wing 3
Court 3	Factory Building, Court 3
Wing 4	Factory Building, Wing 4
Court 4	Factory Building, Court 4
Wing 5	Factory Building, Wing 5
15	Power House
16A	Pump House
17A	Intake House
18	Mechanical Building
20	Laboratory
21	Garage
22	Not Identified
23	Cement House
25A-B	Warehouse
26	Warehouse
30	Pipe Shop
41	Tire Building Area
99B-D	Factory Building (Header Building)



KEY TO BUILDINGS, KELLY-SPRINGFIELD TIRE PLANT SITE PLAN, 1994

Building No.	Building Name/Use
Wing 1	Factory Building, Wing 1
Court 1	Factory Building, Court 1
Wing 1	Factory Building, Wing 2
Court 2	Factory Building, Court 2
Wing 3	Factory Building, Wing 3
Court 3	Factory Building, Court 3
Wing 4	Factory Building, Wing 4
Court 4	Factory Building, Court 4
Wing 5	Factory Building, Wing 5
Court 5	Factory Building, Court 5, Manufacturing
5A	Air Bag Department
11	Banbury Building
15A-B	Power House (15A - Boiler Room, 15 B - Turbine Room)
15C	Oil Storage Tanks
16A	Pump House
16C	Valve House
16D	Stand Pipe
17A	Intake House
18	Mechanical Building
20	Personnel Building
20A	Office Building
21	Garage
22	Not Identified
23	Cement House
23A	Cement House Addition
24	Tire Press Building

Building No.	Building Name/Use
25A-B	Warehouse
26	Sorting Warehouse
26A	Not Identified
26B	Not Identified
26D	Not Identified
26E	Loading Dock
27	Materials Handling
30	Pipe Shop
31	Tire Bulding Area
31A	Tire Building Area
31B	Tire Building Area
35	Gas Valve House
41	Curling Building
41A	Mold Cleaning Building
42	Warehouse
71	Cooling Tower
72	Guard House and Track Scale
73	City Water Valve House (Chlorination)
73A	Water Meter Pit
74A-C	Tire Test Building
80	Hose Reel House
99A-D	Factory Building (Header Building)

SOURCE: Allegany County Commissioners, Cumberland, Maryland



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